How to catch a liar: The Effect of Communicative Channels on Accuracy in Detecting Deception in High-Stakes Situations

J13944

MSc Psychology (Conversion)

PS7112 Research Dissertation
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University of Chester
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Declaration

This work is original and has not been submitted in relation to any other degree or qualification.

Dr. Clea Wright

Signed: …….

Date: …….

Acknowledgments

I would like to convey massive thanks to my supervisor, Dr. Clea Wright, for all of her guidance and support throughout this process. I would also like to thank all those who offered their help and acted as participants in the current study. Thank you for helping things run as smoothly as possible.

Meeting Log

- **17/01/2018 Email Correspondence**

MM contacted Dr. Clea Wright regarding a possible introductory appointment. Appointment booked for following week.

- **25/01/2018 Meeting in office**

Discussion of the dissertation brief and potential avenues of research. Dr. Clea Wright asked MM to familiarize self with the research and begin to consolidate what avenue of research she would like to explore.

- **1/02/2018 Meeting in office**

Specific project selected. MM will focus on effects of channels of communication on deception detection accuracy. Procedure outlined to MM.
One Sample T-Test: assess if participant accuracy scores significantly above the level of chance.
1 way ANOVA, 3 Levels (DV=accuracy): Audio-Visual
Visual- Only
Audio-Only
1 way ANOVA, 3 Levels (DV=confidence): Audio-Visual
Visual-Only
Audio-Only
Between subjects
Discussion that study would be conducted predominantly in a lab-based setting, however look into web-based (RPS) too.
MM to begin working on Ethics Application

- **19/02/2018 Email Correspondence**

MM contacts Dr. Clea Wright regarding ethical approval. Both agree to delay ethics submission until the next deadline (20th April 2018).

- **20/03/2018 Email Correspondence**

Dr. Clea Wright contacts MM regarding a meeting to discuss ethics application. Meeting arranged for 21/03/2018.

- **21/03/2018 Meeting in office**

Discuss progress of ethics application. Arrange to prepare a draft for Dr. Clea Wright within the next week.

- **22/03/2018 Email Correspondence**

Dr. Clea Wright provides examples of elements of ethics form including debrief sheet, consent form and participant information sheet. MM encouraged to use these as a guide and begin preparing first draft.

- **04/04/2018 Email Correspondence**

MM contacts Dr. Clea Wright regarding some questions about ethics application prior to next meeting. Dr. Clea Wright responds with suggested amendments.

- **11/04/2018 Meeting in office**

Meeting to discuss first draft of ethics application. Dr. Clea Wright suggests amendments to be made in the next couple of days.

- **11/04/2018 Email Correspondence**

MM sends Dr. Clea Wright amendments to first draft of ethics application. Dr. Clea Wright responds with additional amendments. MM encouraged to submit application once these changes have been made and begin looking for appropriate videos.

- **17/04/2018 Ethics Application received and under review**

- **03/05/2018 Ethics Application accepted with no amendments required**

- **17/05/2018 Email Correspondence to all dissertation students**

Explaining availability over the Easter break.

- **21/05/2018 Email Correspondence to all dissertation students**

General information regarding dissertation deadlines. Draft submission deadline provided with information regarding feedback. Availability throughout June, July and August provided.

- **23/05/2018 Email Correspondence to all dissertation students**

Additional information regarding draft submission.

- **31/05/2018 Email Correspondence**

MM sends Dr. Clea Wright URL's to video clips found. Dr. Clea Wright is on leave and responds on 04/06/2018.

- **04/06/2018 Email Correspondence**

Dr. Clea Wright looks through clips and responds with some feedback and suggestions. Offers some examples to help if needed. Meeting arranged to discuss videos on 06/06/2018.

- **05/06/2018 Email Correspondence**

MM contacts Dr. Clea Wright regarding video editing software available to download.

- **06/06/2018 Meeting in office**

MM shows Dr. Clea Wright videos obtained for potential use in the current study. Dr. Clea Wright offers videos but MM would like to continue looking herself.

- **06/06/2018 Email Correspondence**

MM contacts Dr. Clea Wright regarding videos found. A total of 8 have been downloaded and edited. MM says she is struggling to find one of a false confession and a false claim of abuse. Dr. Clea Wright offers own videos of this nature.

- **13/06/2018 Meeting in office**

Video clips discussed and finalized. MM tasked with final editing of each video into each communicative channel.

- **19/07/2018 Email Correspondence**

MM contacts Dr. Clea Wright outlining that all videos are edited and ready. Dr. Clea Wright encourages that data collection commences. A meeting is arranged for 23/07/2018.

- **23/07/2018 Meeting in office**

MM shows Dr. Clea Wright final version of video clips. General discussion regarding the process of data collection and subsequent analysis.

- **23/07/2018 Email Correspondence**

Dr. Clea Wright provides MM with a journal to aid Content Analysis.

- **06/08/2018 Email Correspondence**

MM provides Dr. Clea Wright with an update regarding data collection and first draft. Dr. Clea Wright on annual leave until 13/08/2018.

- **13/08/2018 Email Correspondence**

Dr. Clea Wright responds to email asking for a further update regarding data collection. MM responds.

- **22/08/2018 Email Correspondence**

MM contacts Dr. Clea Wright to organize a phone call alongside an update on data collection. Meeting arranged for 28/08/2018.

- **28/08/2018 Phone Call Meeting**

Overall update provided by MM regarding data collection and writing of first draft. Dr. Clea Wright provides a detailed explanation of data analysis for MM to begin in the next couple of days. MM encouraged to contact Dr. Clea Wright when data inputted into SPSS.

- **30/08/2018 Email Correspondence**

MM sends Dr. Clea Wright data input sheet to ensure everything is correct. Dr. Clea Wright responds assuring all is correct and encourages for MM to let her know how she gets on with statistical analyses. MM runs tests and sends Dr. Clea Wright output sheets to check. Assured all looks correct.

- **03/09/2018 Email Correspondence**

MM sends Dr. Clea Wright first draft of write up. A feedback meeting is organized for 11/09/2018.

- **06/09/2018 Email Correspondence to all dissertation students**

Dr. Clea Wright sends reminder to bring a copy of draft to feedback meetings.

- **11/09/2018 Meeting in office**

2 hour meeting receiving feedback of first draft of dissertation write up. MM encouraged to make appropriate changes within the next week. Initial write up of discussion chapter discussed and advice given to MM regarding the points planned already. MM encouraged to contact Dr. Clea Wright if in need of anything before the final submission date.

- **11/09/2018 Email Correspondence**

Dr. Clea Wright provides a journal MM with journal to help with discussion write up.

- **20/09/2018 Email Correspondence**

MM contacts Dr. Clea Wright with some final questions regarding content of Appendices.

Dr. Clea Wright

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Date

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Contents

Tables and Figures

Abstract

Much past research states people are generally quite poor at detecting deception, with meta-analytic findings reporting an average accuracy rating of 54% (Bond & DePaulo, 2006). However, the majority of these previous findings stem from the use of 'low-stakes' lies as stimuli. This current study used real-life video clips of a 'high-stakes' nature, investigating the effects of three different communicative channels on a novice lie detector's ability to detect deception; an Audio-Visual channel, a Visual-Only channel and an Audio-Only channel. The effects on both participant accuracy and participant confidence scores were analysed, with further investigation into a potential relationship between participant accuracy and confidence. On reviewing previous literature, the current study hypothesized the following; participant accuracy in detecting deception across all modalities will score above the level of chance; the highest accuracy scores will be found within the Audio-Visual condition; the Audio-Only condition will produce higher levels of accuracy than those found in the Visual-Only condition; the Audio-Visual condition will produce the highest confidence ratings; no relationship will be found between overall levels of accuracy and confidence ratings reported. The current study also explored what behavioural *cues* are relied upon by novice lie detectors in their attempts to identify deception. No hypothesis was generated for the justification of decisions i.e. (the cues participants report using). However, information provided will help identify what behavioural cues members of the general public rely upon when detecting deception. A total of 60 participants were recruited for the current study, with an equal number of participants observing video-clips within each presentation modality (n=20). 8 video-clips were shown, all involving real-life 'high-stakes' situations i.e. an appeal for a missing relative. Half of the clips involved innocent individuals (telling the truth and not involved in the crime) and the other half were deceitful (involved in the crime and attempting to deceive observers). Overall, participant accuracy scored significantly above the level of chance (M=55, t(59)=2, p=0.05.). No statistically significant differences were found in participant accuracy and participant confidence between the three presentation modalities $F(2,57)=.36$, $p=.70$, $n^2=0.01$; $F(2, 57)=.58$, $p=.84$, $n^2=0.02$. Nor was a significant relationship observed between participant accuracy and participant confidence $r(60)=.11$, $p=.43$. Participants reported relying on behavioural cues involving 'Nervous Behaviours' and 'Fake Emotion' when determining a sender's veracity. Implications and suggestions for future research are discussed.

1. Introduction

"*No mortal can keep a secret. If his lips are silent, he chatters with his fingertips; betrayal oozes out of him at every pore*". (Freud, 1905, pg. 94).

The art of deception has been of long-standing interest to scholars from a variety of fields. The Cambridge Dictionary defines deception as the act of hiding the truth in order to gain an advantage, with the telling of lies a pervasive social phenomenon (Hartwig & Bond, 2014; Cambridge Dictionary, 2015). Deception itself can play a significant role in our daily social interactions, with early research suggesting we each tell an average of two lies a day (DePaulo, Kashy, Kirkendol, Wyer & Epstein, 1996; Hancock, 2007; Wright & Wheatcroft, 2017). Such everyday lies ('white lies' you may say) can be fairly trivial, holding little substance and few repercussions for those involved (Hartwig & Bond, 2014). Such lies are directly related to what we consider a 'low-stakes' situation. However, within different circumstances, i.e. forensic contexts, identifying deception correctly is of great importance. Within such settings, if truths were mistaken for lies (and vice versa), erroneous conclusions could lead to serious consequences for all involved, i.e. life sentences (Granhag & Strömwall, 2004). These lies can be interpreted as 'high-stakes scenarios', given the serious risks involved if the lies are unsuccessful.

Despite veracity judgments holding such consequence, research consistently reports that people are generally poor lie detectors (Wright & Wheatcroft, 2017). Meta-analytic findings indicate that the average accuracy in deception detection equates to 54%, barely above the level of chance (Bond & DePaulo, 2006). During the last few decades, researchers have developed a substantial body of research focusing on deception detection, however to date, most studies examining it's validity have been laboratory based, using low stakes lies as stimuli (Evanoff, Porter & Black, 2016). Consequently, it is difficult to generalize such findings to high-stakes forensic

contexts, for example: within interrogation/judicial settings, despite there being a real forensic need for reliable measures of deception (Carlucci, Compo & Zimmerman, 2013; Evanoff, Porter & Black, 2016).

According to Wright and Wheatcroft (2017) we can attribute lack of accuracy to two key explainers. In order to detect deception effectively, distinctly observable behaviours must first be presented, to allow individuals to differ between the behaviours of a liar and a truth-teller. Secondly, those detecting deception must be aware as to what those behaviours are, in order to ensure correct identification. Failure to identify such behaviours and apply them contextually will hinder one's ability to detect deception, thus highlighting the importance of knowing what one must be looking for (Wright & Wheatcroft, 2017).

1.1 *Cues* to Deceit

Non-Verbal Cues

Communication is entwined throughout every aspect of our daily lives, with no one individual communicating exactly the same as another (Halevy, Shalvi & Verschuere, 2014). In turn, a great level of diversity occurs in our interpretations of behaviour, so it is important to decipher what we mean when explaining each behavioural *cue*. Communicating non-verbally with another can be understood as the process of sending and receiving wordless messages, both consciously and unconsciously (Berger, 2005). Such messages can be conveyed through different means including; body language, facial expressions, eye movement/gaze and gestures. External variables such as an individual's clothing, cleanliness and general demeanour are also considered non-verbal cues (Berger, 2005). According to prior research, up to 90% of our daily interactions consists of non-verbal behaviours, with 'deceptive behaviour' research literature placing great emphasis on the role of body language as an indicative *cue* of deception (Porter & ten Brinke, 2010; Mehrabian, 2017).

In essence, when working to detect lies, it is presumed that we should be more aware of changes in an individual's body language when determining their levels of honesty (Porter and ten Brinke, 2010). Within their meta-analysis, DePaulo et al. (2003) revealed that only a small number of non-verbal cues were considered to be reliably associated with deception; one being involuntary and voluntary illustrator movements. Illustrator movements are considered to be the use of hand and arm movements by an individual to supplement verbal information (DePaulo et al. 2003). Overall, it was found that liars produce fewer illustrators than truth-tellers, alongside fewer hand and finger movements (described as non-functional movements, without moving the arms) (DePaulo et al. 2003; Vrij & Mann, 2004). Porter and ten Brinke (2010) suggest that such a decrease in movement is a direct result of individual motivation, with a motivated liar no doubt increasingly aware of the importance of controlling their body language to appear more credible. Nonetheless, potential over-control may occur, causing liars to appear more rigid and subsequently unnatural.

Furthermore, Martelli, Majaj and Pelli (2005) describe the face as a 'blank canvas', where our thoughts, emotions and objectives are all communicated. Our facial expressions can (on occasions) betray us during our interactions, through the unconscious exposure of our innate psychological states; ones we are attempting to conceal (Porter & ten Brinke, 2010). According to Ekman and Friesen (1975) a liar must disguise their deceit in three ways; through *simulation* (the expression of an insincere emotion), through *masking* (the replacement of a sincere emotion with a false one), and through *neutralization* (preventing the expression of an emotion by appearing impartial).

Through the examination of muscle actions involved in a smile, Duchenne (1862) was the first to propose the concept that one's deceptive facial expression could convey hidden emotions. As a result it was argued that the true expression of a

strong emotion via facial expressions is inevitable. Darwin (1892) also suggested that *"A man when moderately angry, or even when enraged, may command the movements of his body, but...those muscles of the face which are least obedient to the will, will sometimes alone betray a slight or passing emotion"* (pg. 79). From this we can suggest that facial expressions are the most reliable source of deceitful *cues*, and are consequently our biggest traitors. But, is this due to the difficult nature of portraying false emotions, or the impossibility of concealing genuine ones? (Ekman, Davidson & Friesen, 1990).

Ekman (2009) has subsequently branded these expressions "micro-expressions". A micro-expression is essentially defined as the result of a conflict between emotional responses in the brain (Hurley et al. 2014). Although only displayed for a fraction of a second, they provide enough information to clearly exhibit the true nature of a liar's feelings, despite being quickly disguised with a false emotion (Ekman, 2009). Porter and ten Brinke (2008) made use of 'micro-expressions' to investigate the nature of four types of fabricated emotions: happiness, sadness, fear and disgust. Overall, none of the participants were able to effectively produce false expressions without elements of facial betrayal (Porter and ten Brinke, 2008). In addition, individuals were less successful at faking negative emotions in comparison to producing a disingenuous 'happy' expression.

With all this in mind, these findings articulate the idea that facial expressions are a key tool in the identification of deceitful behaviour. The last finding presented by Porter and ten Brinke (2008), in particular, showcases that the identification of negative emotions may be of prime importance within a forensic setting i.e. interrogation of a criminal suspect. According to this field of research, the face can conceal some of the most sought after information and further investigation into this

area could allow for the improvement of deception detection, particularly within forensic and judicial settings (Porter & ten Brinke, 2010).

Whilst research has established the above cues as indicative of deception, research fails to support the generally held belief that non-verbal cues, such as gaze aversion and nervousness, are suggestive of the same, instead concluding that people are relying on incorrect 'stereotypical' cues (Porter & ten Brinke, 2010).
Strömwall, Granhag and Hartwig (2004) outlined 10 practitioners' beliefs about deception, reporting gaze aversion and signs of nervousness as the most commonly used non-verbal cues. Gathering data from 58 countries, the Global Deception Research Team produced similar findings, with 64% of individuals believing that gaze aversion was the most indicative deceptive cue, followed by nervousness (28%), fidgeting and facial expressions/colour (2006). However, said *cues* contradict meta-analytic findings published by DePaulo et al. (2003) (among numerous others for example; Aamodt & Custer, 2006; Bond & DePaulo, 2006; Hartwig & Bond, 2014). Despite popular belief, these *cues* are absent from empirical findings of actual deceptive *cues*, with DePaulo et al. (2003) reporting that liars do not avert their gaze and produce fewer illustrators than truth-tellers. Miller and Stiff (1993) argue that this may be a direct result of the laboratory-based nature of many research findings. With the employment of 'low-stakes' lies as stimuli, it may be that the stakes are not high enough in many given situations to instigate nervous behaviours and their related *cues*. But, we can argue that studies conducted within 'high-stakes' situations have produced similar findings. The aforementioned studies all relate to judicial and forensic contexts, yet maintain that typical nervous behaviours were absent. More renowned examples reiterate this point, for example; the examination of Saddam Hussein's behaviour during a television interview failed to document elements of nervous behaviour, despite the fact he was attempting to deceive millions of people during the Gulf War (Davis & Hadiks, 1995). Instead, we can suggest that other

factors, such as lie complexity and increased focus can cause a decrease in the exhibition of nervous behaviours, all of which will be discussed in greater detail later.

In addition to reliance on inaccurate cues, Hartwig and Bond (2011) suggest that researchers also consider the level of strength provided by valid indicative cues. They hypothesized that a lack of valid cues would hinder accuracy rates and conducted 4 meta-analyses to test this. Agreeable facial expressions, reacting in a cooperative manner, and producing spontaneous and realistic statements were all associated with judgments of honesty (Hartwig & Bond, 2011). These findings uphold the indicative cues highlighted in previous meta-analytic studies (DePaulo et al. 2003; Bond & DePaulo, 2006; Aamodt & Custer, 2006) and therefore can challenge the recurrent claim that many rely on invalid deceptive cues. Conclusions drawn highlight how people rarely rely on the wrong cues, rather, difficulty in detection lies with the overall weakness of behavioural cues themselves. Additional findings suggest that individual intuition exerts more precision than when one uses their knowledge of deceptive cues, essentially implying we should ‘go with our gut’ (Hartwig & Bond, 2011). This notion can be directly linked to the idea that people’s interpretations of deceptive cues and subsequent judgments can derive from the understanding they have of their own deceitful behaviour (Vrij, Edward and Bull, 2001). According to findings, liars are generally unaware of their behaviour when engaging in deception. Therefore when making veracity judgments on others, they believe they themselves display the same behavioural cues they wrongly believe others show. Together, these findings further extend explanations for low accuracy ratings in detection deception.

Para-Verbal Cues

Para-verbal cues involve the pacing, the pitch and the tone of speech. They also encompass the emphasis we place on particular words and the use of repetition or pauses (Merriam-Webster, 2006). It is not the words we use but the way we say them, with research stating that a total of 30% of our daily social interactions consist of these cues (Berger, 2005). Liars tend to produce more frequent speech errors (e.g. word/sentence repetition, incomplete sentences, slips of the tongue) and speech hesitations (e.g. use of speech fillers such as “ah” and “um”) than truth-tellers and speak at an overall slower rate (Ekman, Friesen & Scherer, 1976; Vrij & Mann, 2004). Evidence of para-verbal cues were found by Vrij and Mann (2001) when analyzing the behaviour of a murder suspect during a police interview. Mann, Vrij and Bull (2002) corroborated these findings when studying the behaviour of 16 suspects being held in police custody, with longer pauses and levels of blinking increasingly frequent during deceptive periods (Mann, Vrij & Bull, 2002). Vru and Heaven (1999) state that lie complexity has a direct impact on the occurrence and frequency of speech errors and disturbances, explaining that lies which are difficult to tell result in an increase in speech disturbance and hesitation in comparison to those easy to relay (in turn causing the opposite effect) (Vru & Heaven, 1999). Therefore, we can expect to see a more frequent display of para-verbal cues within more complex (namely forensic) contexts.

Research also suggests that liars tend to speak with a higher pitched voice, most presumably caused by a higher arousal level experienced during deceptive behaviour (Ekman, Friesen & Scherer, 1976). However, observed pitch differences are typically very small and are only detectable with specialized equipment (Kocsis, 2009). In comparison to truth-tellers, vocally liars sound less expressive, more uncertain and more passive, which again may be a result of over-control of one’s behaviour in an attempt to appear more credible (Vrij & Mann, 2001). Liars can also

appear less involved and therefore are assumed to be less cooperative by lie detectors, cues potentially caused by negative emotions experienced by the suspect (Kocsis, 2009).

Verbal Cues

Verbal communication involves the sharing of information between individuals relating to or in the form of words (Oxford Dictionary, 2008). Particularly in forensic settings, exchanges of verbal statements occur where a sender (liar/truth-teller) attempts to deceive the receiver (individual listening to the liar/truth-teller) (Porter & ten Brinke, 2010). Consequently, researchers have begun to investigate characteristics involved within deceptive narratives and how one delivers them (Vrij, 2008).

Distinguishing a liar from a truth-teller is a challenge, however for those considered 'professional lie detectors' (e.g. law enforcement personnel), the need to ensure the safety of a community increases the stakes (Hess, 1997). Therefore, personnel are trained to identify all relevant behaviours (namely verbal cues) when determining suspect veracity (Harpster, Adams & Jarvis, 2009). Rabon (1994) argues the analysis of suspect narratives is of great importance as the selection of each word is a result of an individual's conscious or unconscious choice. Implementing such an in-depth examination of verbal cues can identify linguistic errors, in turn potential deceit, which may arise in an individual's attempt to appear credible (Rabon, 1994).

It has been reported that liars who are considered 'unprepared' respond to questions more reluctantly and have a longer response latency than those who are being honest, with liars also repeating words, phrases and recounting details more frequently than truth-tellers (DePaulo et al. 2003). Additionally, deceitful individuals have been known to use less first-person pronouns ('I', 'me', 'we') and more frequent

negative emotional words (‘hate’, ‘unhappy’, ‘scared’) (Pennebaker, Francis & Booth, 2001). Harpster, Adams and Jarvis (2009) reinforce these cues through their analysis of one hundred audio recordings and transcripts from 911 calls reporting a homicide. Callers who were later convicted of the homicide were found to omit details (minimizing their involvement), repeat words or facts and resist in answering operator questions.

Findings relative to the analysis of verbal-cues have been obtained through the use of Criteria Based Content Analysis (CBCA), a method used to examine suspect statements (Vrij & Mann, 2004). Considered the most widely implemented approach to statement analysis to date, CBCA originates from the ‘Undeutsch hypothesis’, which outlines that statements recounting actual experiences would contain different structural and contextual elements from fabricated statements detailing fictitious events (Harpster, Adams & Jarvis, 2009). Within their detailed review of Criteria-Based Content Analysis, Vrij, Kneller and Mann (2000) identified several key verbal deceptive indicators that will enhance the successful detection of deception. Primarily, investigators focus on the logical structure of the statement, understanding the content and confirming that it flows naturally. Liars are known to provide statements in a well-structured chronological order, in contrast to truth-tellers who provide fragmented statements, recounted incoherently (Vrij, Kneller & Mann, 2000). Secondly, it is important to note the number of details included within a statement. Steller and Koenhken (1989) hypothesized that liars would include fewer details relative to a situation than honest individuals, most likely due to the fear of being questioned or asked to revisit a somewhat irrelevant factor. CBCA experts highlight details including; *contextual embedding* (times and locations), *unusual details* (considered ‘odd’ or ‘unrealistic’), *reproduction of speech* (involving a literal recall of conversations during an event) and *accounts of subjective mental state* (whether an individual includes how they themselves felt during the event) (Vrij & Mann, 2004).

Such details are effective in revealing the true nature of a statement as they are considered too difficult to reproduce and so liars will typically decide to leave such details out of an account.

1.2 Theoretical Explanations for Deceptive Cues

Four Factor Model (Zuckerman, DePaulo & Rosenthal, 1981)

Despite the volume of research presenting a magnitude of indicative deceptive cues, researchers commonly refer to the absence of 'Pinocchio's growing nose': arguing that there is not one verbal, non-verbal or physiological cue uniquely related to deception (DePaulo et al. 2003; Vrij, 2004). This makes deception detection difficult, for they claim there is nothing that researchers can assuredly rely upon. However, an absence of unique cues does not mean that the reactions of liars and truth-tellers are the same. Zuckerman, DePaulo and Rosenthal (1981) maintain that an observable change in one's behaviour does not occur simply because one is being deceitful, rather that such a change occurs as a result of the thoughts, feelings or psychological processes experienced by an individual when attempting to deceive (DePaulo et al. 2003). Zuckerman and colleagues produced a Four Factor Model (1981) to categorise recurring deceptive cues in an attempt to explain when such cues may emerge and why (some of which have been touched upon already in this review). These four factors are; Arousal, Affects Experienced during Deception, Cognitive Aspects of Deception and Behavioural Control (cited in DePaulo et al. 2003). Zuckerman and colleagues (1981) put forward the following:

Arousal: It is believed that liars experience increased arousal levels when engaging in deceitful behaviour, due to the psychological stresses of lying (e.g. fear of being caught). Evident cues related to arousal include; increased pupil dilation, blinking more frequently, recurrent speech disturbances/ errors and speaking in a higher pitch.

Affects Experienced During Deception: The two most prevalent emotions reliably associated with deception are feelings of guilt and fear, resulting in liars increasingly fidgeting, appearing less co-operative, less communicative and providing more obscure and indirect answers than truth-tellers. More recently, Vrij (2000) suggests that dishonest individuals can face an additional emotion: duped delight (Ekman, 2001). For example; a liar may feel excited or enticed by the fact that they now have the opportunity to fool investigators with their fabrications (Vrij & Mann, 2004). The intensity of such emotions will in turn influence the exhibition of behavioural cues by an individual, hence indirectly affecting how successful lie detectors are in identifying elements of deception. That said, the intensity of said emotions would also depend on the personality of the individual in question, alongside the context in which the lie has occurred (Vrij, 2000).

Cognitive Aspects of Deception: Lying can be considered an incredibly complex cognitive task for some individuals, and to conjure and maintain a consistent and plausible account of events can directly impact overt channels of communication. For example; fewer illustrators, longer pauses and more frequent speech errors are all related to increased cognitive load. Vrij (2000) again reinforced this concept, highlighting how liars must construct plausible responses to direct questions and maintain a consistent version of events that will corroborate with not only other statements, but with actual events (Vrij & Mann, 2004). With this in mind, an individual must be cautious not to engage in speech errors (i.e. slips of the tongue) or speech disturbances (e.g. “um”/”ah”) so as to preserve their attempts at appearing credible and thus successfully revisit and confirm previously provided details (e.g. times and locations) (Burgoon, Buller & Guerrero, 1995). Such behaviour is more likely to occur if a liar is unprepared and must concoct a story instantly (Pennebaker, Francis & Booth, 2001).

Behavioural Control (also Impression Management): Liars will attempt to control all aspects of their behaviour to maintain their integrity. So, liars may appear less impulsive and more unnatural than truth-tellers, as they suppress behaviour they believe might reveal their true nature. However, it is unrealistic to believe that all aspects of behaviour can be accounted for effectively, meaning that potential 'leakage' is common. Burgoon and Le Poire (1999) later argued that engaging in 'Impression Management' was the most common method of suppressing the undesirable exhibition of behavioural cues. Liars become increasingly aware that their behaviour is being intensely scrutinized, and so will attempt to quash potential signs of deceit in order to maintain a convincing impression. But numerous elements of one's behaviour must be accounted for: individuals must conceal any nervous behaviour, mask any non-verbal cues that exhibits high levels of concentration, be aware of baseline behaviour (how they normally respond to situations), all whilst displaying a desired response (Vrij & Mann, 2004). Nonetheless, attempts at suppression are deemed useless, for previous research maintains that behaviour will appear rehearsed, unusually smooth and detached as a consequence (DePaulo & Kirkendol, 1989; Vru & Heaven, 1999; DePaulo et al. 2003).

All four factors can occur simultaneously (Vrij, 2000). Which process dominates however depends on the situational context (the type of lie). For example, within a 'low-stakes' situation where the severity of the lie is small, said processes would not be so clear. However, within a 'high-stakes' situation, liars will be more nervous (risk of being caught and detained), liars will have to think more intensely (again to avoid being caught) and liars will be more motivated to appear sincere (more observable attempts to control behaviour to profess innocence) (Vrij & Mann, 2004).

So surely, if these factors provide accurate theoretical explanations for deceptive cues, 'high-stakes' lies should be easy to identify, but yet, so many lie detectors still

struggle (Vrij, 2004). This can be partly explained by Ofshe and Leo's (1997) findings that truth-tellers can undergo identical experiences as deceitful individuals. If an innocent individual is involved within a 'high-stakes' situation (e.g. a child is missing), they will unquestionably experience feelings of fear and anxiety due to the nature of the situation. Consequently, presentation of nervous behaviours i.e. fidgeting, will undoubtedly occur for many will not have been in such a situation before, and so will exhibit the same behaviours as a liar who is fearful of being caught out. Therefore the question still remains as to whether said factors should be translated as indicators of innocence or guilt.

1.3 Detecting Deception in High-Stakes Situations

Previous findings consistently report that on the whole, people are quite poor at detecting deception (Wright & Wheatcroft, 2017). Through the syntheses of 206 studies and the evaluation of 24,483 deceptive cues, Bond and DePaulo's (2006) recent meta-analytic findings revealed that average accuracy scores remained a mere 54%. Other findings also offer no support for a relationship between accuracy and confidence levels when determining individuals' honesty, with findings proving a relationship to be non-existent (DePaulo et al. 1997). Rather that, people report feeling equally as confident in their judgments when both correct and incorrect.

So, what reasons are there to explain such low accuracy rates? As researchers, it would seem feasible to reflect on the methodologies employed within past literature and highlight some potential limitations. For example; one can allude to the type of stimulus materials used in earlier experiments. Largely, previous studies have used 'low-stakes' lies as key stimuli, i.e. having college students telling lies about a mock theft (Frank & Ekman, 1997), henceforth igniting the argument that within the typical laboratory environments, the stakes of such given scenarios were simply not high enough to provoke observable cues to surface (Miller & Stiff, 1993). Thus, detecting

deception is ultimately impossible with the basis of detection dependent on behavioural cues being available to the observer. Factors more prominent within 'high-stakes' situations; such as increased motivation to succeed in a lie, will remain unaccounted for in the body of past research suggesting that subsequent lie detectors will remain unaware of potential cues and continue to identify lies unsuccessfully (DePaulo et al. 2003; Wright Whelan, Wagstaff & Wheatcroft, 2015b). Therefore, future research should consider the increased availability and reliability of deceptive cues within a 'high-stakes' context, which if identified effectively can increase accuracy ratings in observed deception detection.

DePaulo and Morris (2004) also suggested that deceptive cues relative to 'high-stakes' situations have remained unidentified due to their exclusivity to forensic contexts. Similarly to inaccurate stereotypical cues, if individuals are unaware that other indicative cues exist, low accuracy rates will remain within deception research indefinitely. Within the previously discussed study, Harpster, Adams and Jarvis (2009) reported behaviours previously unaccounted for within deceptive literature. Deceitful callers were found to insult or blame the victim, accept a victim's death or focus the call on themselves (not pleading for help) more frequently than honest callers. As a result, we can argue that general beliefs of deceptive cues are not realistic and consequently can hinder one's ability to detect deception effectively. For 'professional lie detectors', obstacles preventing accurate deception detection can be a cause for concern. Ekman and O'Sullivan (1991) however suggest that certain groups of professional lie detectors are more accurate in their veracity judgments than others. 509 people (including law enforcement personnel and working adults and students) were presented with videotapes showing 10 individuals either lying or being truthful about their feelings regarding popular topics. Police officers and polygraph examiners scored similarly to university students (56% and 53% respectively), with Secret Service personnel achieving a score of 64% total

accuracy. This finding seems to corroborate with a developing body of more recent research that suggests in some situations, 'professional lie detectors' achieve greater accuracy rates, with said situations reflecting contexts of a 'high-stakes' forensic nature (Wright & Wheatcroft, 2017). Applying stimulus materials involving real life, 'high-stakes' situations, for example; police interviews of murder suspects or appeals for missing loved ones, accuracy rates were said to increase to levels of 64% and 72% (Mann, Vrij & Bull, 2004; Vrij, Mann, Robbins & Robinson, 2006). More recently, Wright Whelan, Wagstaff and Wheatcroft (2015a) presented 36 videos to 107 police and non-police observers (70 police and 37 non-police) who were asked to discern between liars and truth-tellers. Police officers were found to achieve an average total accuracy of 72% (with non-police observers also achieving an increased accuracy rate of 68%).

Increased accuracy ratings prove that the nature of stimulus materials employed has a direct impact on the effectiveness of observer veracity judgments. Thus, such findings can draw a number of conclusions: firstly, we can argue that said beliefs in incorrect stereotypical cues may only apply to low-stakes situations, for clearly, police officers (among others) are able to identify the correct reliable deceptive cues within the 'high-stakes' context. This may be a result of the 'domain familiarity effect' as proposed by O'Sullivan and Ekman (2004), who found that law professionals were noticeably more successful when detecting deception in a crime based task compared to civilians. Nonetheless, future research should advocate confidence among the relevant personnel and emphasise recently recurring evidence that high accuracy ratings can be achieved and deception detected successfully. From this we can certify levels of ecological validity amongst previous literature. However we can still question if low accuracy levels derived from low-stakes contexts would replicate in a given everyday situation, as potentially disproven by more recent high-stakes findings.

As researchers, it is plausible to expect low ratings of confidence to accompany consistent reports of low accuracy scores. However, research describes a rather unstable relationship within a high-stakes context. For example; both Vrij and Mann (2001) and Mann, Vrij and Bull (2004) found no relationship to exist between confidence and accuracy ratings in the detection of high-stakes lies. Nonetheless, Vrij, Fisher, Mann and Leal later produced opposing findings when participants reported higher levels of confidence when correct in their veracity judgments compared to when incorrect (2006). Again such findings are exclusive to high-stakes forensic situations, with no relationship between observer accuracy and confidence present in low-stakes situations (DePaulo et al. 1997).

Despite the clear limitations discussed within previous research, investigations into deception detection in real-life, high-stakes situations, are still lacking. As highlighted, the small numbers of studies that have explored this phenomenon have reported coherent and reliable results, outlining increased accuracy and (on occasions) confidence levels, unlike such findings from low-stakes detection (Bond & DePaulo, 2006; Wright Whelan, Wagstaff & Wheatcroft, 2015a). Whilst this has allowed for major development within this area of research, studies have focused predominantly on police officers (among other professionals), with little focus on novice lie detectors within high-stakes situations. Thus, a clear rationale for the current study is stipulated.

1.4 Channels of Communication/ Presentation Modalities

There are numerous cues available to the observer throughout a high-stakes lie (e.g. body language, facial expressions, tone of voice) and how a lie is presented to a detector is vital for the successful exposure of deception (Evanoff, Porter & Black, 2016). The manner of presentation is said to directly influence an observer's

attention, understanding and memory of a target, for different types of media vary in both the quality and quantity of information they display (Daft & Lengel, 1986).

Largely in previous literature, videotapes are employed as the leading method of cue presentation, with videos presented in three ways; Audio-Visual cues together, Visual-Only cues and Audio-Only cues (Evanoff, Porter & Black, 2016). Audio-Visual channels describe videos that remain unchanged from their original form, having been sourced from news channels or documentaries for example. Observers are exposed to all types of cues via this communicative channel, including; verbal, non-verbal and para-verbal (Scherer, Feldstein, Bond & Rosenthal, 1985). Participants will have access to a target's expression of body language, the coherence of their statements through the words they use and the tone/pitch of their voice. Extraneous variables apart from the heavily researched cues can also influence judgments of veracity i.e. participants may pass opinions based on how an individual is aesthetically presented (Korva et al. 2013). Generally, if a person appears untidy and disheveled (e.g. clothes are cheap and tattered or individual appears unclean), observers will scrutinize targets and are more likely to deem them as dishonest (Korva et al. 2013). In addition, viewers are able to interpret exchanges between a target and a receiver, e.g. eye contact. Research states that deceitful individuals exert more distant and detached behaviours, and inferences can be made from the level of interaction shown by the target within this communicative channel (Kocsis, 2009).

Within the two remaining channels, many cues are unavailable, given that researchers edit video clips. Visual-Only channels use the same clips, but all sound is removed, with only the video image being presented to viewers. Consequently, all verbal and para-verbal cues are inaccessible thus depriving observers of key communicative elements. Cues such as; speech errors, speech disturbances, word

selection and voice pitch may all have held key indicative cues beneficial to the participant, however veracity judgments are made with less stimuli available as an aid. Similarly, Audio-Only channels again utilize the same clips however all visuals are removed, only sound available to participants. Hence, viewers are deprived of non-verbal cues i.e. illustrator movements, fidgeting, interaction with others, and so will judge the veracity of an individual on available verbal and para-verbal cues alone. Again, attempts to detect deception occur with fewer channels of communication available to guide the viewer.

Daft and Lengel (1986) distinguish communication channels according to levels of 'richness'. 'Richness' defines the ability of a communication medium to broadcast different elements of information from the sender to a receiver (Daft & Lengel, 1986), with explanations for these communicative mediums encompassed in the Media Richness Theory (MRT). This theory hypothesizes that media-rich presentation modalities (i.e. possessing more channels of communication, e.g. Audio-Visual) will provide greater aid to an individual when trying to analyse ambiguous information, suggesting that increased deception detection rates will occur following the observation of a higher number of communicative channels (Evanoff, Porter & Black, 2016). If a message remains unequivocal, participants are able to make inferences from all behavioural cues, i.e. verbal, non-verbal and para-verbal, and therefore can make a 'globally' informed conclusion.

Dennis and Kinney (1998) dispute the theory that MRT increases ones accuracy in deception detection. Evidence shows that rather than promote success when analyzing behaviour, such media-rich modalities can actually overwhelm observers, impeding their ability to distribute their cognitive resources evenly, reducing attention to each channel and therefore leading to loss of information (Dennis & Kinney, 1998). Rockwell and Singleton (2007) support this notion when comparing participant recall

ability across different presentation modalities, i.e. Transcript-Only, Transcript-Audio or Transcript-Audio-Visual, where a negative correlation was observed between media richness and information retained by participants. Furthermore, it has been suggested that the Transcript-Only modality (provision of written information, transcription of verbal cues) is the manner of presentation most saturated in indicative cues (Furnham, Benson & Gunter, 1987), with a greater amount of information garnered from text-only sources comparative to both audio and visual methods. This channel of communication is not included in the current study, however it is important to note that it boasts results of increased focus, attention and memory, thus facilitating accurate detection of deception (Evanoff, Porter & Black, 2016).

Like most previous literature outlined in this review, presentation of communicative channels associated with high-stakes lies has received little research attention, with any empirical reference involving low-stakes stimuli. Bond and DePaulo's (2006) meta-analysis found Visual-Only channels to produce the lowest accuracy ratings, with Burgoon, Blair and Strom (2008) corroborating these findings when analyzing deception detection accuracy within a mock theft context. They also found the Audio-Only channel produced scores of the highest accuracy. Levine et al. (2011) claim that Audio-Only communicative channels consistently yield the greatest accuracy ratings, for a liar's ability to distract observers via non-verbal cues is removed (e.g. head in hands, fidgeting, shaking their head). The influence a sender's demeanor has over veracity judgments is incredible, with research claiming it is the most persuasive source of variation in deception detection judgments (Levine et al. 2011). In addition, (reiterating a point previously outlined) Audio-Only channels also deprive observers of extraneous influences i.e. social information regarding their financial stability or general health, that can are witnessed in Visual-Only and Audio-Visual channels. Limiting the exposure to social information can avoid any evocation of

negative emotions (i.e. distress or pity) that can in turn lead to flawed or mistaken veracity decisions (Levine et al. 2011).

As highlighted, many empirical findings fail to support the MRT, with single channels of communication seemingly possessing the most reliable accuracy ratings. As a result, we can argue that the MRT is not ecologically valid, as published findings would state. Nonetheless, contrary findings argue that presentation modalities make no impact on veracity judgments at all. Evanoff, Porter and Black (2016) were one of the first to evaluate the influence of communicative channels on deception detection within a high-stakes situation. They asked 231 participants to judge the honesty of targets over four different modalities; Audio-Visual, Video-Only, Audio-Only and Transcript-Only using pleas to missing relatives as a stimulus material. Overall, no differences were reported across modalities. These findings further inform the rationale for the current report, with the aim to clarify more clearly, the role presentation modalities play in the identification of lies.

1.5 Objectives and Hypotheses

The current study investigated deception detection in 'high-stakes' situations using video clips through three different channels of communication: Audio-Visual, Visual-Only and Audio-Only. There were three main focus points of the current study: to assess an individual's ability to make accurate veracity judgments based on one of these three communicative channels; to investigate relationships between accuracy and confidence; and to investigate the cues most prominently noted by participants as justifications for their decisions.

In previous literature as outlined above, the hypotheses of the current study were:
Hypothesis 1) Accuracy in detecting deception across all modalities will score above the level of chance.

Hypothesis 2) The highest accuracy scores will be found within the Audio-Visual condition.

Hypothesis 3) The Audio-Only condition will produce higher levels of accuracy than those found in the Visual-Only condition.

Hypothesis 4) Although not highlighted in previous research, we hypothesise the Audio-Visual condition will produce the highest confidence ratings based on the level of information presented to participants within the condition.

Hypothesis 5) No relationship will be found between overall levels of accuracy and confidence ratings reported.

There will be no hypothesis for the justification of decisions i.e. (the cues participants report using). However, information provided will help identify what behavioural cues members of the general public rely upon when detecting deception.

2. Methods

2.1 Participants

60 participants were recruited via opportunity sampling to complete the study, consisting of University of Chester students and members of the general public who responded to our advertised invitations. All participation was voluntary with all participants aged 18 and over. The sample consisted of 21 males and 39 females, and each participant met the outlined requirements of having normal or corrected vision and hearing. We randomly allocated participants to one of three conditions, a total of 20 participants in each. We ensured all data remained anonymous throughout the testing period in order to ensure and maintain participant confidentiality.

2.2 Materials

Our selected stimulus materials contained video footage of various real-life 'high-stakes' situations, including for example; public appeals for missing loved ones and press conferences discussing a murdered relative. In some cases, statements made by an individual in these given situations were honest accounts, where individuals were found to be innocent. However, on other occasions, statements made were deceptive. The suspected individual (who was later convicted or found to be involved) generated communication of a deceitful nature, manipulating the beliefs of the observer by fabricating a version of events (Wright Whelan, Wagstaff & Wheatcroft, 2015a). Eight video clips of a forensic nature were used within the current study, four of which were honest and four deceptive. All videos were taken from an open source i.e. news channels or documentaries from the UK or USA.

We presented each group with the same eight video clips, however stimuli were edited to ensure each group experienced different communicative channels.

Condition 1: involved Audio-Visual stimuli, where video clips were presented in their original form. Participants had full access to all potential behavioural cues, both visual images and audio soundtrack available.

Condition 2: involved Visual-Only stimuli, where audio was removed from the video clip.

Condition 3: involved Audio-Only stimuli, with all visual images removed.

The average duration of materials was 55 seconds. It is important to reiterate that all stimuli reflected real-life 'high-stakes' situations. Suspects found to be deceptive were sentenced for the crime.

2.3 Procedure

Prior to any data collection, the University of Chester Ethics Committee granted ethical approval for the current study (See Appendix A.). Upon arrival at the lab, participants were provided with an instruction and response sheet, and instructed about the presentation of the eight video clips, all involving real-life 'high-stakes' situations, where a suspect was either guilty or innocent, and they would be asked to decipher whether the individuals were deceptive or truthful. Given that participants were also randomly allocated to one of three communicative channels, they were made aware if the presented clip had been edited. After being presented with each clip, individuals were asked to check the respective options; if they believed the suspect in the video clip to be lying (e.g. was involved in the crime), or telling the truth (e.g. was not involved in the crime and expression of innocence was genuine). Two other options on the response sheet were available to participants; they were instructed to select whether they were familiar with the case and its outcome, or if they would prefer not to answer the question. In both cases participants were not required to answer the related follow-up questions, and were advised to move on to the next video clip. Participant familiarity ranged from zero to 3 cases (M=2, SD=1),

and one participant selected that they would prefer not to respond on two questions. We presented all videos in the same order in each condition.

For each clip participants were also asked to rate how confident they were with the veracity judgments they had just made. Ratings were scored on a 5 point Likert scale, with 1=Very Unconfident and 5=Very Confident. Finally, after each clip, participants were asked to indicate how they had interpreted the suspects' behaviour and the influence it had on their judgments of honesty. No information regarding typically indicative cues of deception had been given to participants prior to the completion of this study, so any cues highlighted were freely reported.

The only source of information available to participants was that presented in each of the eight video clips. Participants were deprived of any contextual information, for example: the names of the suspects and the details of the crime. However, within some clips, the names of the alleged suspect appeared as a visual on the screen, or were mentioned in the narrative (namely, in videos that had been sourced from a general news programme). Images of alleged victims were also available in the Audio-Visual and Visual-Only conditions. The exclusion of contextual information prevents any extraneous variables from manipulating participants' instinctive decisions.

2.4 Design and Analysis

Quantitative Analysis

The current study featured a between subjects design. Prior to any statistical analysis, normality checks were conducted to ensure the normal distribution of data. Subsequently a One Sample T-Test was run to calculate if on the whole, participants were able to score significantly above chance. Following this, a one-way ANOVA with three levels was performed, to measure whether channels of communication

affected accuracy in veracity judgments. The Independent variable was the channel of communication assigned to each condition; Audio-Visual, Visual-Only and Audio-Only. The Dependent variable was the accuracy scores generated. A further one-way ANOVA was conducted, with the communicative channels remaining as the Independent variable, but with Confidence as the Dependent Variable. We also performed a Pearson's Correlational Analysis in order to establish whether an overall relationship existed between accuracy and confidence ratings. A second correlational assessment was conducted between accuracy and confidence ratings in each of the three communicative channels, to explore whether any differences emerged regarding relationship strength between each condition.

Content Analysis

The reporting of indicative behavioural cues for deception were analysed through Content Analysis. Participants freely reported all cues; no direction or prescribed cues were provided at any point during the study. An inductive approach was used for the current analysis in order to establish new findings generated through the current data. Three separate analyses were conducted, one for each condition, to determine the predominant cues reported in each separate communicative channel. Each analysis was conducted in the same way.

Firstly, all reported behaviours in relation to a deceitful veracity judgment were accumulated for each participant. Each behaviour was categorized as a particular *cue*. Each cue produced a different theme within the data, all of which were highlighted separately. Cues were then grouped together in larger categories to reduce the number of variables within the analysis. Within each category, the frequency of which participants reported each cue was calculated as a percentage to allow for a direct comparison between each of the three conditions.

3. Results

3.1. Quantitative Analysis

Before reporting our findings, it is important to reiterate the hypotheses of the current study:

Hypothesis 1 Accuracy in detecting deception across all modalities will score above the level of chance.

Hypothesis 2 The highest accuracy scores will be found within the Audio-Visual condition.

Hypothesis 3 The Audio-Only condition will produce higher levels of accuracy than those found in the Visual-Only condition.

Hypothesis 4 Although not highlighted in previous research, we hypothesise the Audio-Visual condition will produce the highest confidence ratings based on the level of information presented to participants within the condition.

Hypothesis 5 No relationship will be found between overall levels of accuracy and confidence ratings reported.

Measures of deception detection were taken in the form of accuracy scores and ratings of confidence. Accuracy scores were converted into percentages (%) to account for cases where participants were either familiar with the case or preferred not to answer the question. Mean confidence ratings were calculated from the 5-point Likert scale for each participant. Shapiro-Wilk tests for normality and a Levene's Test of Homogeneity of Variance were performed to ensure data met criteria for parametric analyses. No significant results for any conditions with measures of both accuracy and confidence were found. Additionally, the Levene tests for homogeneity of variance reinforced that there were no significant deviations in either sets of data; Accuracy ($F(2, 57)=.26$, $p=.77$) and Confidence ($F(2, 57)=.18$, $p=.84$). Thus, these results confirmed no violation of the assumption of a normal distribution occurred, nor

did variance differ across groups. As a result, we could continue with our statistical analysis.

Means and Standard Deviations for accuracy and confidence scores for each of the three communicative channels are outlined in separate tables below.

Table 1. Means (%) and Standard Deviations of Levels of Accuracy in Deception Detection.

Condition	N	Mean (%)	Std. Dev.
Audio-Visual	20	57.2	19.8
Visual-Only	20	55.6	18.4
Audio-Only	20	52.1	19.8
Total	**60**	**55.0**	**19.1**

Table 2. Means and Standard Deviations of Confidence Ratings in Deception Detection.

Condition	N	Mean	Std. Dev.
Audio-Visual	20	3.4	.58
Visual-Only	20	3.2	.59
Audio-Only	20	3.3	.59
Total	**60**	**3.3**	**.58**

A one sample t-test comparing participants overall levels of accuracy with levels expected by chance reported significant findings (See Table 1.) $t(59)=2$, $p=0.05$. This supports the current study's first hypothesis.

A one-way ANOVA compared levels of accuracy in detecting deception across three levels; Audio-Visual, Visual-Only and Audio-Only. It showed that mean accuracy scores did not differ significantly between the three communicative channels (See Table 1.) $F(2,57)=.36$, $p=.70$, $n^2=0.01$, thus providing no statistical support for hypothesis 2 and 3.

A second one-way ANOVA tested participant ratings of confidence in their veracity judgments with the same three levels; Audio-Visual, Visual-Only and Audio-Only. It showed that mean confidence ratings did not differ significantly between the three communicative channels (See Table 2.) $F(2, 57)=.58$, $p=.84$, $n^2=0.02$, therefore providing no statistical support for hypothesis 4.

Pearson's Correlation was performed to detect a potential relationship between overall accuracy scores and confidence ratings. The relationship was not significant $r(60)=.11$, $p=.43$. Further correlational analyses were undertaken to explore the prospective impact that communicative channels of communication may have on the relationship between accuracy scores and confidence ratings. Within all three conditions, non-significant findings were reported: $r(20)=.09$, $p=.72$; $r(20)=.25$, $p=.29$; $r(20)=-.24$, $p=.31$ respectively. These results provide no statistical support for hypothesis 5.

3.2. Content Analysis

As previously highlighted, no hypothesis regarding the justification of decisions was outlined; however, behaviours recorded by participants, as potential indicators of deceptive behaviour will in turn contribute to the reliable identification of what behavioural cues the general public predominantly rely upon when detecting deception. The analysis employed in the present study followed similar processes used in previous studies (Mann, Vrij & Bull, 2004; Wright & Wheatcroft, 2017). Each participant's response was analysed through an Inductive Content Analysis approach, where the recurrent report of deceptive behaviours were identified and organised into cues. Each behaviour reported was organised into one '*cue'* and no response was associated with more than one '*cue*', thus generating a substantial list of both valid and reliable behavioural '*cues*', and thereby allowing for a clear reflection of the vast range of answers provided by members of the general public. From this, the free-report '*cues*' were grouped into larger, more general categories to ensure the lists remained practicable for the researcher, and to encompass similar or relatable 'cues'. This '*cues*' analysis was conducted in relation to each communicative channel: Audio-Visual, Visual-Only and Audio- Only. All categories and '*cues'* relative to each condition are highlighted in the separate respective tables below.

Table 3. Content Analysis of self-reported *cues* of deception in Condition 1 (Audio-Visual)

Category	Cue	Description	Example (taken from primary data)	Frequency (%)
Body Language	Head	Position/ Movement	"Did not trust the way he looked down and to the left at the end of the clip" (P8)	**5%**
	Face	Covering, Blocking, Expressions	"Covering their face" (P3) "Lots of covering face" (P16)	**25%**
	Arm/Hand	Position, Movement	"His body language i.e. arms and wringing of hands made me distrust him" (P8)	**15%**

	Nervous Behaviours	Fidgeting, Fiddling, Excessive movement, Shaking, Rigidity, Heavy Breathing, Sweating	"Fidgeting with hands, nervous, worried", "Twiddling fingers" (P2)	**60%**
	General	Unspecified or other		**10%**
Emotion	Fake Emotion	Crocodile tears, Excessive emotion, Inconsistent emotion	"Trying too hard to seem upset" (P13) "Crying seems fake" (P14)	**60%**
	Lack of Emotion	Calm, Controlled, Indifference, Distant, Delayed Reactions	"Came across as upset at the start but as the clip went on she relaxed and showed no emotion" (P18)	**40%**
	Genuine Emotion	Sobbing, Real Tears	"High levels of emotion" (P5)	**5%**
Eyes	Eye Contact	Aversion, Covering Eyes	"He can't look the investigator in the eye which would suggest he is lying" (P5)	**45%**
	Eye Movement	Blinking, Darting	"Blinked too much!" (P19)	**5%**
Verbal Information	Speech Errors	Repetition, Mumbling, Stuttering, Hesitations, Rehearsed, Unnatural, Pauses	"Repeats 'I didn't' too much, not believable" (P1)	**55%**
	Avoidance	Irrelevance, Reading Statements, Impersonal, Distracting Questions, Vague	"You wouldn't ask about your dogs if your husband has just been shot" (P9)	**55%**
	Plausibility	Lack of plausibility, lack of consistency, lack of detail	"His story remains unclear" (P20) "Kept getting his story wrong" (P9)	**45%**
	Focus on Self	Concern for self, Instant Denial, Justifications	"Doesn't seem very upset-more bothered by the accusations against him" (P20)	**45%**
Vocal Features	Pitch	High Pitch	"Voice too high pitched" (P7) "Voice goes higher at the end of sentences" (P14)	**10%**
	Distinct Emotion	Shaky Voice	"Crying but sounds like their forcing their voice to shake" (P14)	**5%**
	General	Unspecified or other		**5%**
Other	Appearance	Clothing, Cleanliness, Personal Hygiene	"His attire (clothing) doesn't help his case in my opinion" (P2)	**5%**
	Circumstance	Ethnicity, Relationship to victim	"Her ethnicity had a factor in my decisions" (P2)	**5%**
	Family	Behaviour of present family members	"Husband/Dad made no eye contact when mum was talking" (P3)	**20%**

A total of 20 free-report cues were identified within participant responses in Condition 1 (Audio-Visual) (See Table 3). The cues were subsequently grouped into six categories. The categories were; Body Language, Emotion, Eyes, Verbal Information, Vocal Features and Other. The frequency of which each cue was reported by participants was calculated and expressed as a percentage (%) (See Table 3.). All behaviours were accounted for and categorised. Behaviours reported most frequently included both 'Nervous Behaviours' and perceived 'Fake Emotion', with 60% of participants (*n*=12) relying on these free-report cues as a method of deception detection. Conversely, 'Head Movements', 'Genuine Emotion', 'Eye Movements', 'Shaking Voices' and "External Cues' (i.e. appearance and ethnicity) were highlighted as the least reliable behavioural cues, all achieving a frequency score of 5% (*n*=1).

Table 4. Content Analysis of self-reported *cues* of deception in Condition 2 (Visual-Only)

Category	Cue	Description	Example (taken from the primary data)	Frequency (%)
Body Language	Head	Position, Movement	"The lady has her head bowed majority of the time, looks pale but no tears" (P21)	**50%**
	Face	Covering, Blocking, Expressions	"The man has quite a smug expression which makes it seem like he is lying" (P25)	**55%**
	Arm/Hand	Position, Movement	"Hand gestures appears to imply he is uncomfortable" (P34)	**20%**
	Nervous Behaviours	Fiddling, Fidgeting, Excessive movement, Shaking, Rigidity, Heavy/Fast Paced Breathing, Rocking, Lack of Movement	"He also seems to fidget a lot, as he rocks himself back and forwards when he is talking aswell" (P24)	**75%**
	General	Unspecified or other		**25%**
Emotion	Fake Emotion	Crocodile tears, Excessive emotion, Inconsistent emotion, Exaggerated emotion, Staged Responses	"I felt like this couples response to the press was staged. Neither of them really showed their emotions in a way I would have expected." (P23); "She is trying too hard with her face to look upset that she forgets about her body. If she	**65%**

			was truly distraught her body would match" (P31)	
	Lack of Emotion	Calm, Controlled, Indifference, Distant, Delayed Reactions, Blank. Directing focus on self	"Man is emotionless, doesn't say anything, cold" (P34); "No empathy behind their eyes" (P37)	**45%**
Eyes	Eye Aversion	Aversion, Covering eyes	"Didn't keep eye contact" (P40); "He can't make eye contact" (P36)	**60%**
	Eye Movement	Blinking, Darting, Unfocused, Rolling	"Keeps raising his eyes up to the left" (P27); "He is also blinking a lot in a short space of time" (P31)	**60%**
Appearance of Speech/Verbal Factors	Rate of Speech	Too Fast, Too Slow, Constant	"Speaking a lot, does not seem to take time to think about what they're saying" (P35)	**15%**
	Speech Dysfluency	Hesitations. Pauses, Speech Fillers, Rehearsed, Unnatural	"He pauses. When the interviewer asks him a question it appears as though he has to take a moment to recover and figure out what to say" (P25)	**10%**
Other	Family Members	Behaviour of other present family members	"The husband is slightly smirking throughout and seems easily distracted, whilst the wife doesn't show a lot of real emotion and is very neutral" (P31)	**10%**

Condition 2 (Visual-Only) produced a total of 12 free-report cues (See Table 4). The cues were grouped into five categories. The categories were; Body Language, Emotion, Eyes, Appearance of Speech/Verbal Factors and Other. The frequency of which each cue was reported by participants was calculated and expressed as a percentage (%) (See Table 4). All behaviours were accounted for and categorised. Observed behaviours reported most frequently were 'Nervous Behaviours', with 75% of participants (*n*=15) relying on this free-report cue as a method of deception detection. However, both perceived 'Speech Dysfluencies' and 'External Cues' (i.e. behaviour of other present family members) were deemed the least reliable, both achieving a frequency score of 10% (*n*=2).

Table 5. Content Analysis of self-reported *cues* of deception in Condition 3 (Audio-Only)

Category	Cue	Description	Example (taken from primary data)	Frequency (%)
Emotion	Forced Emotion	Crocodile tears, Excessive emotion, Inconsistent emotion, Exaggerated emotion, Staged Responses	"Overreacted too much, putting the tears on a bit" (P41)	**65%**
	Lack of Emotion	Calm, Controlled, Indifference, Distant, Delayed Reactions, Blank. Directing focus on self	"Wasn't sincere or empathetic at all" (P56) "Doesn't seem emotional despite professing to be" (P58)	**30%**
	Genuine Emotion	High levels of emotion	"Very distressed and upset" (P51)	**5%**
Verbal Information	Speech Errors/Dysfluency	Repetition, Mumbling, Stuttering, Hesitations, Rehearsed, Unnatural, Pauses, Rambling, Over-controlled	"He kept stuttering in the interview and wasn't 100% on details, he kept repeating 'I think'" (P44)	**25%**
	Avoidance	Irrelevance, Reading Statements, Impersonal, Distracting Questions, Vague, Rhetorical Questions, Deflecting situation	"Mentions aunts and uncles and close family before the victim which I found quite strange" (P57)	**55%**
	Plausibility	Lack of plausibility, lack of consistency, Lack of detail	"He sounded guilty but his story didn't seem right. Like he was changing his story as he told it"(P43)	**60%**
	Focus on Self	Concern for self, Instant Denial, Justifications, Pleading Innocence	"Painting themselves in a better light by donating child's organs-makes them feel better" (P52)	**30%**
	Use of Language	Violent language, Strange choice of words, Insincerity, Rhetorical Questions, Unconfident	"He seemed very defensive and swearing, seemed quite violent" (P44); "He asks himself rhetorical questions as if he already knew what he wanted to ask and had prepared an answer" (P50)	**45%**
Vocal Features	Pitch	High Pitch	"Quite high pitched" (P49) 'Voice is very high pitched and goes up at the end of sentences" (P54)	**10%**
	Tone	Strange, Unconfident	"Seems to change tone at the end when talking about him being missing" (P42)	**10%**
	Vocal Changes	Changes in a short space of time	"Begins clip with a trembling voice but by the end is steady and calm-seems strange" (P54)	**15%**
	General	Unspecified or other		**10%**

Finally, a total of 12 free-report cues were identified in Condition 3 (Audio-Only) (See Table 5). The cues were grouped into three key categories. The categories were; Emotion, Verbal Information and Vocal Features. The frequency of which each cue was reported by participants was calculated and expressed as a percentage (%) (See Table 5). All behaviours were accounted for and categorised. The most recurrent reported behavioural cue was perceived 'Fake Emotion, with 65% of participants (*n*=13) relying on this free-report cue as a method of deception detection. However, the expression of 'Genuine Emotion' was reported least often with a frequency score of 5% (*n*=1).

4. Discussion

The current study had three main focus points; to assess an individual's ability to make accurate veracity judgments based on one of the three communicative channels; to investigate relationships between accuracy and confidence; and to investigate the '*cues'* most prominently noted by participants as justifications for their decisions. Results only offered statistical support for one of the five hypotheses: participants distinguished liars from truth-tellers significantly above the level of chance (55%). In terms of the remaining outcomes, no significant differences were found in participant accuracy scores between the three channels of communication examined, nor were any statistical differences observed in confidence ratings. Finally, an overall non-significant relationship was discovered between accuracy and confidence ratings, with relationships between accuracy and confidence within each communicative channel replicating this finding.

The current study reported an overall accuracy score of 55%, significantly above the level of chance. Despite successfully confirming our first hypothesis, the findings reinforce the general belief that people are poor at detecting deception, corroborating the vast majority of previous literature in this area. This statistic supports the average score of 54% obtained from the meta-analytic findings of Bond and DePaulo (2006). Nonetheless, whilst it would be plausible for us to accept this finding as it stands, we must consider that concurring findings were all found through the use of 'low-stakes' stimuli. When drawing direct comparisons with more recent research, particularly those using 'high-stakes' contexts, the results present very different conclusions. For example, Hartwig and Bond's (2014) meta-analysis focused primarily on the detectability of lies from multiple 'cues', with all conditions reflecting real-life forensic settings. Through the synthesis of 144 studies (including 26,866 cues), they found an overall detection rating of 70%. Additionally in previously discussed findings, Mann, Vrij and Bull (2004) presented 99 police officers with videotaped police interviews of suspects in custody, tasking them with distinguishing between liars and truth-tellers, and reported accuracy levels between 64 and 72%. Wright Whelan, Wagstaff and Wheatcroft (2015a) support these findings, when they too produced accuracy scores of 72% among police observers. With these findings in mind, we could suggest that the current study should have generated a higher level of overall accuracy due to the utilization of similar high-stakes situations. For this reason we should question why the current study did not replicate these results.

As always there are numerous explanations for the attainment of an average score. Firstly, when drawing direct comparisons between preceding studies and the present report, it is evident that previous participant samples consisted of 'professional lie detectors', i.e. law enforcement personnel. Therefore, such a stark increase in reported accuracy ratings is clearly feasible. Accuracy levels of 64% and 72% were achieved by Secret Service personnel, members of the FBI, CIA or general police

officers, all of whom are specifically trained in the art of detecting deception (Ekman & O'Sullivan, 1991; Mann, Vrij & Bull, 2004; Wright Whelan, Wagstaff & Wheatcroft, 2015a). Novice lie detectors, who made up the current sample, have no prior experience or training, so although similar high-stakes stimuli has been used here, it would be illogical for us as researchers to expect the same level of accuracy. Saying this, alongside their reported 72% accuracy ratings, Wright Whelan, Wagstaff & Wheatcroft (2015a) found that non-police observers successfully identified deception at a rate of 68%, highlighting how higher accuracy scores can be achieved by novice lie detectors.

To our knowledge this is one of only a few reports to include a participant sample of solely novice lie detectors within a high-stakes context, meaning our ability to draw direct comparisons with other findings is limited. With a vast proportion of aforementioned findings arguing people are generally poor at detecting deception, we can question why individual ability would differ simply because the stakes of the situation have increased. Ability itself is considered a stable construct, something that will not change; therefore the intensity of a situation should have no effect. However, the literature also specifies how deceptive '*cues'* appear more frequently and become more prominent as the stakes of a situation increase; therefore it would not be unfounded for one to assume that detection would be easier within the given high-stakes scenarios (Vrij & Mann, 2004; Bond & DePaulo, 2006; Porter and ten Brinke, 2010). Therefore, it is clear that a greater amount of research is required to provide a valid statistical baseline through which researchers can compare findings regarding the ability of novice observers in detecting deception within high-stakes forensic contexts.

In contrast to our first hypothesis, non-significant findings were reported for participant accuracy between the three communicative channels, thus providing no

support for the second and third hypotheses. Evanoff, Porter and Black (2016) stated that how a lie is presented to an observer is vital in the successful exposure of deception; but current findings do not substantiate this point. In fact, our findings seem to dispute a large volume of those found previously, theoretical explanations included. Within their meta-analysis, Bond and DePaulo (2006) stated that the presentation of Visual-Only stimuli produced the lowest accuracy scores, with Audio-Only generating the highest. Levine et al. (2011) reinforced these findings, arguing that these higher ratings of accuracy were due to the withdrawal of non-verbal cues. According to Levine et al. (2011) removal of non-verbal cues from presentation modalities eliminates a liar's opportunity to manipulate an observer through the exhibition of such of non-verbal cues i.e. fidgeting, fiddling, heavy breathing. Nonetheless, the current findings dispute this, instead indicating that presentation modalities fail to exert any influence over accuracy in deception detection.

Like most of the literature discussed in this report, aforementioned findings again derive from studies using low-stakes stimuli. In contrast, the current study employed materials of a forensic high-stakes nature, similar to those used by Evanoff, Black and Porter (2016). We can draw empirical support from this study, as they too reported no significant differences in participant accuracy between presentation modalities. Porter et al. (2002) again found comparable results when investigating the influence of presentation modality on judgments between truthful or deceptive descriptions of emotional memories. With this support, we must in turn reject the theoretical approach, provided by the Media Richness Theory (Daft & Lengel, 1986). As outlined, this theory suggests that media-rich presentation modalities (Audio-Visual channel in our case) will provide enhanced data to observers through increased behavioural information. Essentially, our Audio-Visual channel gave participants all available behavioural cues, be it; verbal, non-verbal, para-verbal, etc. As a result, it was hypothesized that individuals could thus make a 'global' judgment

regarding a sender's veracity. But, without statistical support we cannot wholly accept this theory to be true. Nor can we accept the counter arguments produced by Dennis and Kinney (1998), who instead argued that media-lean modalities would in fact generate greater accuracy. Instead, our findings suggest that presentation modality has no affect at all and can in some way reinforce our significant finding that people cannot effectively detect deception, regardless of the abundance of behavioural cues at their disposal.

Consequently we can claim that deception detection results within low-stakes situations cannot be replicated within high-stakes contexts. Meta-analytical findings regularly state that behavioural cues indicative of deception emerge more frequently and more noticeably when the stakes of a situation increase (Bond & DePaulo, 2006; Vrij & Mann, 2004; Porter and ten Brinke, 2010), therefore we can suggest that cue availability was similar within all three of the current communicative channels, hence leading to a lack of difference between them. If cue availability did increase in such a manner as research suggests, participants would have had sufficient information to make an accurate veracity judgment in each channel, regardless of how the stimuli was presented to them. Unlike previous findings, the current study can therefore advocate that presentation modality has no influence over the accuracy of veracity judgments in high-stakes situations. We argue that this is due to increasingly prominent behavioural cues available to the observer and hence can provide a clear explanation for the lack of significant difference in accuracy between the current communicative channels.

However, like Evanoff, Black and Porter (2016) we can offer a second explanation from an alternative perspective, arguing that a truth-bias may have played a role in our lack of significant findings. Normally when making veracity judgments, novice lie detectors are biased toward the truth (Bond & DePaulo, 2006; Vrij, 2008). According

to Ekman (1996), our weak deception ability stems from our preference to trust others, rather than hold suspicion towards them. Doubting one's veracity can essentially undermine our chances of establishing closeness and affection with another (Ekman, 1996). Chaiken and Eagly (1989) state that as humans, we have the capacity to process information in one of two ways; heuristically or analytically. Heuristic processing primarily involves intuitive veracity judgments, made at a faster pace with little reliance on available cognitive resources, and thus yields a greater proportion of truth-biased rulings; in direct comparison to analytic processing, where deceptive verdicts are made at a slower rate, with greater use of cognitive resources (Chaiken & Eagly 1989). Thus, we could contend that participants made direct veracity judgments through the use of 'heuristic processing' for the following reasons. Firstly, Gilbert, Krull and Malone (1990) state that when interpreting incoming information, an individual deems the content to be truthful before being able to logically assess its validity. Essentially, suspecting deceit requires 'extra-effort' (or deeper analytic processing) (Vrij, 2008). Due to the instantaneous nature of heuristic processing, taking insufficient time to evaluate information and make informed judgments will mean many will deem an individual to be truthful without processing information appropriately (Street & Masip, 2015). This could be directly applicable to participants in the current study. Whilst all individuals were encouraged to spend an appropriate amount of time on each presented stimulus, many made a veracity judgment almost immediately after playing the clip, indicating an instantaneous decision with little consideration of all available behavioural cues. If this were the case, a clear explanation can be offered regarding our non-significant accuracy findings.

Additionally, such immediate judgments can be made based on the amount of information available to individuals. Masip, Garrido and Herrero (2010) outlined that in the majority of studies, the materials used are too brief, depriving individuals of the

ability to intensely analyse any behavioural cues. Therefore, low accuracy ratings should only be expected. The current study may be guilty of this. The average length of materials used (*n*=24) totalled a mere 55 seconds, with no contextual or background information offered to participants regarding any of the high-stakes situations presented. With this in mind, it is probable that the current sample may have been unsure of the information provided, and so, unable to definitively argue the occurrence of deception, may have simply deemed the person truthful (or simply guessed). Wright and Wheatcroft (2017) can further support this argument. They stated that failure to identify observable behaviours and apply them contextually would hinder one's ability to detect deception. The length of the materials were equivalent across all communicative channels, meaning participants were given access to the same span of information. Regardless of the method of presentation, participants were only provided a short period of time to observe the behaviour of the sender, therefore all individuals may have struggled in identifying indicative behavioural cues due to the short duration of the clips. If this were the case, it is again evident why a lack of significant difference between the three channels occurred.

The current findings also fail to support our fourth and fifth hypotheses. No significant differences were observed in participant confidence ratings between the three communicative channels. Although this hypothesis deviates from what is reported within deceptive literature, as researchers we theorized that participants would rate feeling most confident within a channel where all behavioural cues were at their disposal, i.e. Audio-Visual channel. We believed that with all behavioural cues available, participants would feel confident regarding their decisions, given the abundance of information provided, yet no differences were found. This finding can be interpreted more clearly in conjunction with the absence of a significant relationship found between overall participant accuracy and confidence. Considering

the lack of difference in accuracy levels, it is logical to have found the same with regard to confidence. These findings correspond with the general consensus presented within deceptive literature, that a relationship between accuracy and confidence levels does not exist (DePaulo et al. 1997). Therefore these findings reinforce what we already know, and reiterate that if people are poor judges of deception (something this study also supports), then they should avoid trusting their own sense of whether they believe that are being deceived or not (DePaulo et al. 1997). Evidently, confidence should not be relied upon as a guide to guarantee the accurate detection of deception.

Together with our non-significant findings, participants overall confidence ratings should be considered. Participants average confidence levels were reported at a level of 3.3 out of 5, a relatively impartial score. This suggests that participants were neither confident nor unconfident in their veracity judgments and further supplements the idea that participants were simply guessing as to whether individuals were lying or not. Therefore our lack of significant findings with regard to confidence can lead us to conclude that presentation modality also exerts no influence over confidence ratings, nor provides an association between participant accuracy and levels of confidence.

A clear hypothesis regarding indicative behavioural cues was not generated for the current study, instead, our aim was to identify prominent free-report *'cues'* relied upon by novice lie detectors attempting to make accurate veracity judgments in high-stakes contexts. Previous literature regularly argues that much of what people believe to indicate deception is wrong, with their focus on 'stereotypical' *cues* resulting in inaccurate veracity judgments. For example; research states that gaze aversion and nervous behaviours are deemed the most indicative *cues* to deception, with 64% and 28% of individuals relying on these characteristics respectively

(Strömwall, Granhag & Hartwig, 2004; Global Deception Research Team, 2006). In line with this research, participants of the current study reported nervous behaviours most frequently in their explanations as to how they made their veracity judgments, achieving frequency scores of 60% in the Audio-Visual communicative channel and 75% in the Visual-Only channel (obviously not reported within the Audio-Only channel). Whilst nervous behaviours are typically understood to be incorrect stereotypical cues, we must remember that findings arguing this case again derive from studies using low-stakes stimuli. Consequently, these findings are not directly applicable with high-stakes contexts, therefore given the current study's increase in situational stakes; we can argue that this cue is both applicable and potentially exclusive to high-stakes situations. Our finding regarding an overall accuracy significantly above the level of chance can support this claim. Considering participants obtained significant levels of accuracy (55%), we can argue they are indeed relying on valid behavioural cues, as surely participants would not have gained such a significant score with a reliance on inaccurate behaviours.

However, in contrast to previous findings, participants of the current study did not identify gaze aversion as a predominant cue for deceit. Gaze aversion achieved frequency scores of 45% and 60% in the Audio-Visual and Visual-Only channels respectively, however it was cues relative to emotion that followed nervous behaviours as the second most cited free-report cue. Emotion related cues, i.e. fake emotion and lack of emotion, were spontaneously reported by participants, proving to be the only behavioural category that maintained high frequency reports across all three modalities. Participants reported fake emotion most frequently; 60% (Audio-Visual), 65% (Visual-Only) and 65% (Audio-Only), thereby suggesting emotional cues play an important role in decision making by novice lie detectors, and the findings of Wright Whelan and Wheatcroft (2017) support this claim. They found three emotion-related cues to be spontaneously reported by almost one third of

police officers within their sample (namely fake emotion, lack of emotion and genuine emotion). However, both our findings, and the aforementioned, contrast with those of Mann, Vrij and Bull (2004) who failed to report observed *cues* relative to emotion within their analysis. However, both the current study and that conducted by Wright Whelan and Wheatcroft (2017) included highly emotional materials, i.e. pleas for a missing person, situations that participants may empathize with or even relate to in some sense. If participants perceive a sender as insincere within a highly emotional situation, we can assume that they would interpret such behaviour as a key *cue* of deception.

Verbal and vocal categories received less attention from participants, indicating that individuals, when determining one's honesty, overlook these behavioural *cues*. Considering research maintains that only 30% of our daily interactions consist of verbal and para-verbal communication, the finding that these *cues* are largely discounted is acceptable (Berger, 2005). Within our Audio-Visual channel, mention of verbal and vocal characteristics ranged from 5-55%, with speech errors and avoidant statements referenced most frequently. Even within our Audio-Only channel, where participants had access to verbal and para-verbal cues only, fake emotion was the most frequently cited behavioural cue, with an individuals' plausibility following with a frequency of 60%. As a result, we can put forth the argument that both verbal and para-verbal cues are overlooked unless completely obvious to the individual. In our case, participants referred to the content of information presented, over any other cue, for example; participants made greater reference to the lack of details within a sender's story in comparison to how they conveyed this information (e.g. tone). However, participants did provide empirical support for the innovative findings of Harpster, Adams and Jarvis (2009), with 45% and 30% of individuals noting how a sender directly focused situations on themselves, denying the victim any attention

and attempting to deny or generate concern for themselves instead in both the Audio-Visual and Audio-Only channels.

Lastly, external cues (i.e. reference to a sender's appearance or family members) were rarely mentioned, achieving frequency scores of between 5%-20% in both our Audio-Visual channel and Visual-Only channel. No reference was made to external cues within the Audio-Only channel. However, lack of reference to such cues is unsurprising considering the nature of the stimuli used and the fact that senders within each video-clip demanded such attention from the observer (Wright Whelan & Wheatcroft, 2017).

Overall, all cues identified by participants as indicative of deception corroborated with cues discussed within previous deceptive literature (DePaulo et al. 2003; Bond & DePaulo, 2006; Hartwig & Bond, 2014). In conjunction with our only statistical finding- that participants can accurately detect deception significantly above the level of chance, we can conclude that people are generally relying on the correct cues. Therefore in this case we can overlook the common belief that individuals focus on incorrect stereotypical cues, instead accepting Hartwig and Bond's (2011) argument that it is not the reliance on inaccurate cues that can generate low accuracy levels, but the strength of valid indicative behaviours presented. With people generally poor at detecting deception and the sample of novice lie detectors maintaining that this is the case (55%), we can suggest that, the overall presentation of behavioural cues in the current study may have been weak, causing difficulty for the current participants to successfully identify them. However, this is difficult to accept considering the highly intense nature of the stimuli included, thus we can contend that it may also be again due to lack of participant experience in detecting high-stakes lies (DePaulo & Morris, 2004).

Potential Limitations and Recommendations for Future Research

One potential reason for non-significant findings in accuracy and confidence between communicative channels could be the length of the materials used as stimuli. The average length of video-clips used was 55 seconds, and in keeping with our discussion, may have been too brief and uninformative for participants to decipher between liars and truth-tellers effectively. The current study included video-clips of a shorter duration to ensure that the process did not become tedious for participants, especially for those randomly allocated to the Visual-Only channel, although this has not yet been proven as a disadvantage. If we had provided participants with stimuli of a longer duration they would have had more information to analyse. Therefore, researchers should take note that the length of stimuli material might have a direct impact on the significance of findings; providing future participants with sufficiently more materials, I feel, could possibly improve findings accordingly. With this in mind, future research could look at assessing the length of stimuli employed as a variable within itself, comparing the accuracy and confidence of participants viewing similar stimuli but of different durations. This will allow for researchers to establish if shorter video-clips can hinder one's ability when detecting deception and vice versa.

Focusing again on the video-clips themselves, four out of our eight stimuli presented individuals with a high-stakes situation within a 'televised' environment. Half of the clips involved public appeals where the sender was addressing not only the people directly in front of them, but also those who would be watching behind the cameras. Two of these appeals were honest and two were deceptive, yet regardless, all clips highlighted an extremely intense real-life situation, of which all senders' would never have been involved with before. As a result, honest individuals may have experienced increased levels of anxiety (given the unorthodox situation and distress at the idea of losing a loved one) in turn producing nervous cues such as shaking, trembles in their voice or gaze aversion, among many others. In contrast, for

deceitful individuals, this provides the opportunity for a ‘performance’, where they must act accordingly to maintain their credibility and generate feelings of pity from the audience. Both cases may be detrimental to our participants’ ability to successfully identify deception in the current study, as they will not be observing a sender’s natural communicative style. As such, it may be of greater benefit to participants if future researchers’ use stimuli relative to more conventional settings, i.e. police interviews of potential suspects.

In keeping with the above point, the current participants were deprived of any contextual or background information regarding the senders or the case as a whole, thus would not have known each sender’s natural communicative style or baseline behaviour. As researchers, we are asking a lot of our participants: novice lie detectors, to accurately and confidently identify deceptive behaviour presented by an unfamiliar individual, within an informative presentation averaging just 55 seconds. Thus, a possible modification to the current procedure could be to use several video-clips of the sender to ensure that participants are equipped with a substantial amount of information. For example, when making use of recorded police interviews, researchers should include segments from different stages of an investigation, i.e. an interview to develop a rapport with an individual under suspicion, an interview when a suspect has been arrested and finally an interview when a suspect has been charged. A greater level of detail can offer richer stimuli to participants, in turn inciting more resolute responses. In addition, they may be more likely to identify and acknowledge individual differences in behaviour.

Finally on a more general note, a disparity in participant motivation may have hindered the production of significant differences between communicative channels. As highlighted within previous literature, a liar’s motivation to succeed in their deceit is heightened as the stakes of the situation increase, equally so for law enforcement

personnel in their detection of such deception (Porter and ten Brinke, 2010). However, it is difficult to argue the same for participants of a research study. Our participants were offered no reward for identifying deception correctly; so all levels of motivation to succeed in detection were subjective and based entirely on their own interest in the topic of the current study. Objectively, all participants would have experienced differing levels of motivation, considering all participation was voluntary. Nonetheless, with no element of incentive, it is clear the sender's motivation would outweigh the observer's in our case: realistically without any real gain, participants aren't incentivised to identify deception correctly. If participants were offered a reward for the accurate detection of deception, individuals may dedicate a greater amount of time and effort to the task presented, and potentially generate significantly different or improved findings, potentially as increased accuracy levels between communicative channels.

5. Conclusion

The current study had three main focus points; to assess an individual's ability to make accurate veracity judgments based on one of the three communicative channels; to investigate relationships between accuracy and confidence; and to investigate the *cues* most prominently noted by participants as justifications for their decisions. Results only offered statistical support for one of the five hypotheses: participants distinguished liars from truth-tellers significantly above the level of chance (55%). Accuracy and confidence scores between presentation modalities did not significantly differ. An overall non-significant relationship was discovered between accuracy and confidence ratings, with relationships between accuracy and confidence within each communicative channel reproducing this finding.

Our findings regarding overall participant accuracy is in keeping with Bond and DePaulo's (2006) meta-analytic findings reporting an overall accuracy average of 54%. Despite opposing much of previous literature, our reports of a lack of significant difference in participant accuracy between communicative channels support those of Evanoff, Porter and Black (2016) who also failed to establish significant differences between presentation modalities. Finally, our findings reinforce those of DePaulo et al. (1997) who maintain that no relationship exists between accuracy and confidence levels.

Modifications to the materials used in the current study may be beneficial to future research. Firstly, increasing the length of stimuli can reduce the chance of participants processing information heuristically (Masip, Garrido and Herrero, 2010), in turn decreasing the level of truth-bias judgments and discouraging guesses. In addition, the inclusion of contextual or background information is suggested for future research, to provide participants the opportunity to establish a behavioural baseline and attempt to distinguish between deceptive cues and individual differences in a sender's behaviour.

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7. Appendices

A. Ethical Approval

Staff / Office Use Only
DOPEC NUMBER: ---------- *Click here to enter text.* MMCN030618
Umbrella project DOPEC number (staff) *Click here to enter text.*

APPLICANT SURNAME [redacted]

APPLICANT:	**UG ☐**	**PGT ☒**	**PGR ☐**	**Staff ☐**
REVIEW PROCESS:	**Accelerated ☒ Full ☐**			
APPLICATION STATUS:	**New application ☒ Major amendment ☐ Resubmission ☐**			
APPLICATION FOR:	**Dissertation ☒ Teaching ☐ Research & publication ☐**			
ATTTENDENCE AT HEALTH & SAFETY BRIEFING:	**Yes ☒ No ☐ N/A ☐**			
INCLUSION OF RISK ASSESSMENT FORM:	**Yes ☐ No ☐ N/A ☒**			

NOTES ON THE ROLE AND FUNCTION OF THE DEPARTMENT OF PSYCHOLOGY ETHICS COMMITTEE.

- *All decisions of the committee are based on the application form and reviewers comments ONLY. Forms should be as detailed and clear as possible. Verbal discussions are not considered as part of the application or review process.*
- *The review process strictly adheres to the University of Chester Research Governance Handbook and the BPS Code of Ethics.*
- *The decision of the committee is final. If you are a UG, PGT or PGR student you should discuss the decision of the committee with your supervisor. If you are a member of staff you may contact the chair of the committee for further clarification.*

Before completing the form researchers are expected to familiarise themselves with the regulatory codes and codes of conduct and ethics relevant to their areas of research, including those of relevant professional organisations and ensure that research which they propose is designed to comply with such codes.
Department of Psychology Ethical Approval for Research: Procedural Guidelines.
University of Chester Research Governance Handbook
http://ganymede2.chester.ac.uk/view.php?title_id=522471
BPS Code of Ethics
http://www.bps.org.uk/system/files/Public%20files/bps_code_of_ethics_2009.pdf
BPS Code of Human Research Ethics
http://www.bps.org.uk/sites/default/files/documents/code_of_human_research_ethics.pdf
BPS Guidelines for Internet-mediated Research
http://www.bps.org.uk/system/files/Public%20files/inf206-guidelines-for-internet-mediated-research.pdf
BPS Research Guidelines and Policy Documents
http://www.bps.org.uk/publications/policy-and-guidelines/research-guidelines-policy-documents/research-guidelines-poli

Any queries email: n.davies@chester.ac.uk or psychology_ethics@chester.ac.uk

CHECK LIST.

Please complete the form below indicating attached materials. Prior to submission supervisors must confirm that they have reviewed the application by completing the supervisors column.

Notes: Students to indicate where information is found, supervisor to confirm by ticking green column	Supervisor confirmation	Information. Sheet	Letter	Email	Email info. Page	Consent Form	PowerPoint	N/A
Brief details about the purpose of the study	☒	☒	☐	☒	☐	☐	☐	☐
Contact details for further information	☒	☒	☐	☒	☐	☐	☐	☐
Explanation of how and why participant has been chosen	☒	☒	☐	☐	☐	☐	☐	☐
Notification that materials/interviews are not diagnostic tools/therapy or used for staff review/development purposes	☐	☐	☐	☐	☐	☐	☐	☒
Explanation participation is voluntary	☒	☒	☐	☒	☐	☒	☐	☐
Details of any incentives or compensation	☒	☒	☐	☒	☐	☐	☐	☐
Details of how consent will be obtained	☒	☒	☐	☐	☐	☐	☐	☐
If research is observational, consent to being observed	☐	☐	☐	☐	☐	☐	☐	☒
Details of procedure so participants are informed about what to expect	☒	☒	☐	☐	☐	☐	☐	☐
Details of time commitments expected	☒	☒	☐	☐	☐	☐	☐	☐
Details of any stimuli used	☒	☒	☐	☐	☐	☐	☐	☐
Explanation of right to withdraw and right to withdraw procedure	☒	☒	☐	☒	☐	☒	☐	☐
Option for omitting questions participant does not wish to answer	☒	☒	☐	☐	☐	☐	☐	☐
Procedure regarding partially completed questionnaires or interviews	☒	☒	☐	☐	☐	☐	☐	☐
With interviews, information regarding time limit for withdrawal	☐	☐	☐	☐	☐	☐	☐	☒
Details of any advantages and benefits of taking part	☒	☒	☐	☒	☐	☐	☐	☐
Details of any disadvantages and risks of taking part	☒	☒	☐	☐	☐	☐	☐	☐
Information that data will be treated with full confidentiality and that, if published, those data will not be identifiable as theirs	☒	☒	☐	☒	☐	☒	☐	☐
Debriefing details	☒	☒	☐	☐	☐	☐	☐	☐
Dissemination information	☒	☒	☐	☐	☐	☐	☐	☐
Further information (relevant literature; support networks etc.)	☒	☒	☐	☐	☐	☐	☐	☐

Supervisor Signature: Clea Wright ***Date: 11/04/2018***

University of Chester

DEPARTMENT OF PSYCHOLOGY APPLICATION TO DEPARTMENTAL ETHICS COMMITTEE

WHEN COMPLETING THE FORM PLEASE REFER TO THE DOP ETHICS PROCEDURAL GUIDELINES HANDBOOK.
UG AND PGT STUDENTS CAN ACCESS A COPY ON THEIR RELEVANT MOODLE PAGE.
PGR AND STAFF SHOULD CONTACT n.davies@chester.ac.uk or psychology_ethics@chester.ac.uk

1. Working title of the study

Notes: The title should be a single sentence

How to catch a liar: The effects of channels of communication on the accuracy of deception detection.

2. Applicant name and contact details

Notes: The primary applicant is the name of the person who has overall responsibility for the study. Include their appointment or position held and their qualifications. For studies where students and/or research assistants will undertake the research, the primary applicant is the student (UG, PGT, PGR) and supervisor is the co-applicant.

[redacted]
Psychology MSc Student
BSc (Hons)
Email Address: 1407811@chester.ac.uk

3. Co-applicants

Notes: List the names of all researchers involved in the study. Include their appointment or position held and their qualifications

Dr. Clea Wright
Senior Lecturer
MA (Hons), MSc, PhD, CPsychol, FHEA

4. Start and end dates of the study

Notes: The title should be a single sentence

April 2018- September 2018

5. Is this project subject to external funding?

NOtes: Please provide details of the funding body, grant application and PI.

6. Briefly describe the purpose and rational of the research

Notes: (Maximum 300 words). In writing the rationale make sure that the research proposed is grounded in relevant literature, and the hypotheses emerge from recent research and are logically structured.
If this application is for a PGR/Staff funded project please attach any detailed research proposals as appropriate.

The purpose of this research is to examine the effects of channels of behaviour/communication on the accuracy of deception detection (i.e. speech, non-verbal cues). Deception itself plays a significant role in our daily social interactions, with most people being lied to several times a day (Wright & Wheatcroft, 2017). However, despite deception being a prevalent social phenomenon, previous findings show that we as people are only able to detect lies at or slightly above the level of chance (50%) (Bond & DePaulo, 2006; Hartwig & Bond, 2011). In addition, De Paulo et al. (1997) state that individuals report feeling just as confident when their determinations of deception are incorrect, as when they are correct.

To date, most studies examining deception detection have focused on low-stake lies as stimuli (Evanoff, Porter & Black, 2016), with findings from such studies being potentially inapplicable to a forensic context, i.e. courtroom or interrogation settings, where lies can have significant consequences for the individual (ten Brinke & Porter, 2012). 'Professional lie detectors' such as judiciary or law enforcement personnel are expected and believed to have a higher ability to detect lies, but research suggests that their performance is of similar levels to that of a layperson (Vrij, Mann, Robbins & Robinson, 2006). Ekman and O'Sullivan (1991) found that police officers and polygraph examiners scored similarly to university students in their ability to detect deception (56% total accuracy to 53% total accuracy). Nonetheless, when presented with high-stake lies, aforementioned personnel appear to accurately identify lies at a higher rate. Mann, Vrij and Bull (2004) asked police officers to differentiate truth and lies told by individuals in police custody via a videotaped interview. In these cases, accuracy rates were around 65%- considerably higher than those of low-stake lies. This would make sense seeing as high-stake lies are of more relevance to professional lie catchers, therefore, we can appreciate a greater level of accuracy when making decisions on lies of a greater consequence (Evanoff, Porter & Black, 2016).

Whilst more accurate scores can reassure us that appropriate personnel are more inclined to detect deception in high-stake situations, we can argue that scores remain in need of improvement. Ekman and O'Sullivan (2004) attribute scores of low accuracy to the fact that a clear idea of what distinguishes a good or poor liar has yet to emerge. In order for deception to be successfully detected we must be able to effectively differentiate between the behaviours of a liar and that of a truth-teller: more specifically in a high stake situation (Wright & Wheatcroft, 2017). Only recently have particular behavioural attributes began to emerge. Liars in such situations can 'leak' both verbal and non-verbal cues, indicating their deception (DePaulo et al, 2003). te Brinke and Porter (2012) stated that targets displayed insincere facial expressions, smirking, and used more hand illustrators when lying. Whilst these are important findings, there remains a slight gap in the

research where we can question how accurate non-professional lie detectors would be when presented with real-life high stake lies?

Additionally, considering the main types of cues present throughout high-stake lies, it is also important to consider the way the lie is presented (Evanoff, Porter & Black, 2016). Black, Woodworth and Porter (2012) state that the manner in which a target is presented to an observer has implications for the observer's attention to, comprehension of and memory of the target. More specifically, varying the portrayal of the target via media (videos) can affect the quantity and quality of information conveyed to the observer. The role of presentation modality has received little research attention, and any that have been conducted have investigated low stake lies. Using different methods of video portrayal, Evanoff, Porter and Black (2016) found that deception detection was only slightly above chance (52.5%), with no differences across presentation modality. This contrasts with previous findings from Ekman and O'Sullivan (2004), who found that when participants observed different channels of behaviour (speech and non-verbal, between liars and truth tellers), those who mentioned both speech and non-verbal cues in their justification of liars and truth-tellers had a higher accuracy than those who mentioned only one channel of behaviour.

Taking considerations from recent research findings, the current study hypotheses the following: 1) Accuracy scores obtained will be similar to or slightly above chance, 2) The highest accuracy scores will be reported when all behavioural cues presented (i.e. both visual and auditory information), 3) There will be a difference in levels of accuracy between presentation of visual only and auditory only information, 4) Participants will report similar levels of confidence when decision of deception detection is both in/correct and 5) There will be no hypothesis about the justification of decision, but information will help answer the research question regarding what behavioural/communication cues people rely on as forms of deception detection.

7a. Describe the methods and procedures of the study

Notes: (Maximum 500 words) Attach any relevant material (questionnaires, supporting information etc.) as appendices and summarise them briefly here (e.g. Cognitive Failures Questionnaire: a standardised self-report measure on the frequency of everyday cognitive slips). Do not merely list the names of measures and/or their acronyms. Include information about any interventions, interview schedules, duration, order and frequency of assessments. It should be clear exactly what will happen to participants. If this is a media based study describe and list materials include links and sampling procedure.

The study itself will involve a 1x3 between subjects design with one independent variable (accuracy in deception detection) and 3 dependent variables (observing different modalities: both visual and auditory, visual only and auditory only). Almost all elements of the study will aim to be conducted within a lab-based setting, in the Psychology department at the University of Chester. If this is inconvenient for participants, the study will be conducted in a similar suitable environment at convenience to them.

Individuals will be invited to participate via convenience sampling, where participants will voluntarily participate. Invitations to partake, with a brief outline of the study, will be advertised on RPS primarily (See Appendix D). When a time and place is confirmed, participants will receive written instructions, provided on a Participant Information Sheet (See Appendix A.). This Information Sheet will provide a more detailed outline of the study itself and provide the opportunity for the participant to ask any questions. They will then be presented with a consent form (See Appendix B.) if deciding they would like to continue. Participants will be randomly allocated to one of the 3 conditions (pulling condition type from a hat). In all conditions participants will be presented with a total of 10 video clips, involving real-life high stake situations. As mentioned, the only change in procedure between conditions will be the presentation of the video clip: 1) both visual and auditory information, 2) visual information only and 3) auditory information only. Videos will be sourced from the internet (i.e. YouTube or news websites) and from the co-applicant for this study: Dr Clea Wright. The videos will revolve around a forensic nature, for example: involving individuals being interviewed for a serious crime. The content will be similar to what can be viewed on a general news programme. Duration of the videos and consequently the visit as a whole is not specifically known at this point, however it should be no longer than 30 minutes.

After being presented with each video, participants will be asked to write down on a provided response sheet (See Appendix G.) whether they believe the individual in the video is 1) Telling the truth, 2) Lying, 3) If they are familiar with the case presented (if familiar with the case, the video will be disregarded from the subsequent accuracy scores) or 4) If they prefer not to say (again this video will be disregarded from subsequent analysis). In addition, participants will be asked to self-assess how confident they are with their decision on a scale of 1-5 (most typically a Likert scale). Finally, they will be asked to describe how they arrived at their decision as a form of justification. All answers will be recorded in written form and collected by the researcher at the end of the study. At the end of the study, each participant will be fully debriefed (also provided with a Debrief Information Sheet, See Appendix C). This again will provide an opportunity for any discussion or questions that may arise.

No personal data will be collected during the current study, so all data will be anonymous to maintain participant confidentiality. The accumulated data will then be analysed in two ways: Statistical analysis and Content analysis. Descriptive and Inferential statistics will be produced using a one way ANOVA, to establish if there any statistical significant differences between the three independent variables. Content analysis will also be employed to analyse the behavioural cues identified by

participants, which helped to justify their decision when differentiating between a liar and a truth teller. This will allow for identified cues to be categorised and linked with previously established findings.

7b. Provide details of your contingency plan

Notes: Please briefly describe your contingency plan. (100 words)

If unable to recruit a sufficient number of participants via RPS, recruitment invitations will be widened to include posters (See Appendix F.) and social media posts (namely on Facebook and Twitter, see Appendix E.) to other students and family/friends. Emails will also be sent to family and friends inviting them to participate (See Appendix E). Outlines of these are included in the Appendices of this form.

8. Provide details of the previous experience of the procedures by the person conducting the study.

Notes: Say who will be undertaking the procedures involved and what training and/or experience they have. If supervision is necessary, indicate who will provide it.

I, as the main researcher, will be conducting all procedures used in the current study, however the co-applicant and supervisor for the current study, Dr. Clea Wright, will be on hand to supervise me throughout the process. In terms of previous experience, I feel confident in all aspects of forthcoming data collection. I have previously completed an undergraduate research dissertation in Sports Psychology at the University of Chester so am familiar with all protocol and guidelines regarding the dissertation process. I have kept in mind that I am now conducting a research dissertation with a separate department and therefore some guidelines may be different so have discussed with my supervisor any queries I had regarding this.

In terms of the current data collection and subsequent analysis, I have not previously used media clips as a form of data collection, nor have I recruited participants via RPS but am working to familiarise myself with both aspects of the research. Nonetheless, I feel confident in my ability to conduct myself professionally as a researcher i.e. providing relevant information/debriefing, obtaining informed consent, etc. More specifically, I am familiar with both methods of analysis being suggested for the forthcoming study. I have included both ANOVA's and Content Analysis in assignments submitted to the Psychology Department for the Psychology Conversion MSc but maintain that if I come across any difficulty I will make use of any help on offer.

9. Describe the ethical issues raised by this study and discuss the measures taken to address them.

Notes: Describe any discomfort or inconvenience that participants may experience. Include information about procedures that for some people could be physically stressful or might impact on the safety of participants, e.g. interviews, probing questions, noise levels, visual stimuli, equipment; or that for some people could be psychologically stressful, e.g. mood induction procedures, tasks with high failure rate, please include your distress protocol. Discuss any issues of anonymity and confidentiality as they relate to your study; refer to ethics handbook and guidance notes at the end of the form. If animal based include ethical issues relating to observation.

Whilst major ethical issues are not anticipated for the current study, one issue may arise regarding the nature of some video clips included. Due to their potentially distressing nature (being of a forensic nature), participants may become upset when presented with the selected video clips, as many highlight real-life high stake situations. Whether familiar with the cases or not, the videos may evoke negative emotions from participants. Not only this, participants may feel a sense of pressure to identify deception correctly, despite not knowing the outcome. With this in mind, information regarding these potential risks will be included in the information sheet (See Appendix A.) given to participants prior to partaking in the study. All participants will also be informed that the nature and content of the videos will be similar to that viewed on a general news programme before the video clips are presented. Participants will be made aware that they are free to withdraw participation from the study at any time during their allotted data collection time, if this is the case.

Finally, following the completion of the study, debriefing participants will be made a priority (See Debrief Information Sheet in Appendix C), ensuring that any such emotions/feelings are dealt with appropriately. For example; students will be advised to go and visit their PAT, or Student Support located on the university campus, other participants would be advised to visit their GP. Again, they will be reminded they can withdraw from the study if concerned with such after effects.

10.Describe the participants of the study.

Notes: Describe the groups of participants that will be recruited and the principal eligibility criteria and ineligibility criteria. Make clear how many participants you plan to recruit into the study in total.

A total of 60 participants aim to be recruited for the current study, 20 participants for each condition. Those most likely to take part (through convenience) will be undergraduate and postgraduate Psychology students from the University of Chester, and the invitation will be extended to friends and family if needed. Ideally, participants should have normal or corrected vision and hearing, in order to understand the videos presented successfully. In addition, due to the potentially distressing nature of some selected video clips, anybody who suffers from a mental health condition (i.e. depression, anxiety), or feels they are more susceptible to any negative emotional states, may not want to volunteer. It may also be deemed appropriate if participants are over 18 years of age.

11. Describe the participant recruitment procedures for the study.

Notes: Gives details of how potential participants will be identified or recruited, please list any social media platforms that you will use and the message. Include all other advertising materials (posters, emails, letters, verbal script etc.) as appendices and refer to them as appropriate. Describe any screening examinations. If it serves to explain the procedures better, include as an appendix a flow chart and refer to it.

Participants will be recruited via convenience sampling and will voluntarily participate. The first method of recruitment will be within the University of Chester via the Research Participation System used by the Department of Psychology. An invitation to participate in the current study will be posted (See Appendix D.) and participants will be awarded two credits for their time. In addition, posters will be placed around the University Campus, mainly in the University Library and Departmental building inviting other student to partake (See Appendix F). Finally, if participation level has still not reached requirements, invitations will be extended to friends and family via social media platforms (namely; Facebook and Twitter) and email (See Appendix E). Within all elements of recruitment, a brief outline of the study itself will be included so each potential participant has a clear idea as to what the study entails and what would be expected of them. All methods of recruitment have been attached as Appendices to this form.

12. Describe the procedures to obtain informed consent

*Notes: Describe when consent will be obtained. If consent is from **adult participants**, give details of who will take consent and how it will be done. If you plan to seek informed consent from **vulnerable groups** (e.g. people with learning difficulties, victims of crime), say how you will ensure that consent is voluntary and fully informed.*

*If you are recruiting **children or young adults** (aged under 18 years) specify the age-range of participants and describe the arrangements for seeking informed consent from a person with parental responsibility. If you intend to provide children under 16 with information about the study and seek agreement, outline how this process will vary according to their age and level of understanding.*

How long will you allow potential participants to decide whether or not to take part? What arrangements have been made for people who might not adequately understand verbal explanations or written information given in English, or who have special communication needs?

If you are not obtaining consent, explain why not.

Informed Consent will be obtained from all participants directly. Each individual will be presented with a consent form (See Appendix B.) at the beginning of their allotted participation slot, alongside an Information Sheet (See Appendix A.), providing a detailed outline of the study. After reading the Information Sheet and having a discussion with me regarding any queries relevant to the study, participants can decide then and there if they wish to fully participate and henceforth, consent

will be obtained and stored in a written form. Alongside this I will ensure to remind participants that despite signing the consent form, if they do change their mind, they are free to withdraw during this time. This detail will also be included within the Information Sheet, Consent Form and Debrief Sheet, two of which are theirs to keep.

Following data collection, all participants will be made aware that they are free to withdraw at any point during their participation, up until they hand in their response sheet at the end of the study (See Appendix G). This sheet will not include any personal information, so beyond this point it will be impossible to identify their particular data set to erase it from the overall results. Consequently, participants will have the duration of their allotted time slot to decide whether they would like to continue to participate in the current study.

13. Will consent be written?

Yes ☒ *No* ☐

*Notes: If **yes**, include a consent form as an appendix. If **no**, describe and justify an alternative procedure (verbal, electronic etc.) in the space below.*
Guidance on how to draft Participant Information sheet and Consent form can be found on PS6001 Moodle space and in the Handbook.

Consent form included in Appendix B.

14. Describe the information given to participants. Indicate if and why any information on procedures or purpose of the study will be withheld.

Notes: Include an Information Sheet that sets out the purpose of the study and what will be required of the participant as appendices and refer to it as appropriate. If any information is to be withheld, justify this decision. More than one Information Sheet may be necessary.

No information will be withheld from participants during this study. All information will be included in the outline on the Information Sheet, which will be given to all participants prior to any participation. The designed Information Sheet can be found in Appendix A. of this Ethics Form, providing a detailed account of the current study. Information will also be included on a Debrief Sheet (in Appendix C) to outline the purpose and procedure of the study following participation, which they can keep once finished.

15. Indicate if any personally identifiable information is to be made available beyond the research team. (Eg: a report to an organisation)

Notes: If so, indicate to whom and describe how confidentiality and anonymity will be maintained at all stages.

All data collected for the purpose of this study will be anonymous; henceforth no participant will be personally identified within this study. The data will be collected

solely for the purpose of this research dissertation and will not be passed to anybody outside of the research team.

16. Describe any payments, expenses or other benefits and inducements offered to participants.

Notes: Give details. If it is monetary say how much, how it will be paid and on what basis is the amount determined. Indicate RPS credits.

Undergraduate or Postgraduate Psychology Students from the University of Chester will receive 2 credits towards their total credit scores on the RPS system. Other participants i.e. friends and family or other students will not receive credits or any other inducements.

17. Describe the information about the investigation given to participants at the end of the study.

Notes: Give details of debriefings, ways of alleviating any distress that might be caused by the study and ways of dealing with any clinical problem that may arise relating to the focus of the study.

Following completion of the study, participants will have an opportunity to discuss any initial questions about the study itself. They will receive a full debrief (Debrief form in Appendix C.) on what will happen next, regarding their specific data set. For example, I will explain how no personal information is included on their response sheet so they cannot be identified at all during this study. I will also assure them that their data will be stored in a safe place and will only be used for this research dissertation.

From this, I will ask them how they found the study and if they found any video clips distressing or uncomfortable. If so, I will do my best to help them as much as possible at the given time, i.e. provide consolation or advice. However, I would encourage them to visit their PAT or any services made available at university that would help them with any negative emotions they are experiencing (if a university student) or advise them to visit their GP or a trusted professional (for any other participants). The Debrief form will provide contact for additional support if they feel this is required. I will try my best to follow up with these participants to ensure they have sought any help they needed. Nevertheless, if any participant has found any part of the study distressing and such problems arise, I will ensure to let the co-applicant and supervisor of this study, Dr. Clea Wright, aware of all on goings with participants.

18. Describe data security arrangements for during and after the study.

Notes: Digital data stored on a computer requires compliance with the Data Protection Act; indicate if you have discussed this with your supervisor and describe any special circumstances that have been identified from that discussion. Say who will have access to participants' personal data and for how long personal data will be stored or accessed after the study has ended.

participants' personal data and for how long personal data will be stored or accessed after the study has ended.

During the study, data including; Consent forms, written accuracy scores, scales of confidence and detailed outlines of decisional justifications, will all be stored securely in a folder, locked away in a safe environment. The only person to access such raw data would be myself and Dr. Clea Wright if necessary.

Raw data will also be stored on a computer, given the need to input some aspects of the data to conduct a statistical analysis. The need to comply with the Data Protection Act has been discussed with my supervisor and data will be anonymous, with no names included at any point. Again all data will be stored in a locked folder, with a password requirement to access the data. This again is to ensure that nobody, other than myself, can access the raw data for this study.

When the study is completed, raw data will be retained for approximately 6 months. This is a precaution in case any aspect of the research dissertation needs to be revisited following submission. However, once the research dissertation has been submitted and the result has been determined, there will be no need to retain data and so the decision will be taken to appropriately erase participants' raw data and consent forms.

SIGNATURES OF THE RESEARCH TEAM

Notes: The primary applicant and all co-applicants must sign and date the form. Scanned or electronic signatures are acceptable.

[redacted] Clea Wright 11/04/2018

How to catch a liar: The effects of channels of communication on the accuracy of deception detection.

Participant Information Sheet

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?

The purpose of this research is to examine the effects of channels of behaviour/communication on the accuracy of deception detection (i.e. speech, non-verbal cues). Essentially, this study will aim to explore how well individuals can differentiate between liars and truth-tellers by focusing on different elements of individual behaviour (for example: body language, limb movement, facial expressions, use of language, etc.). This is an academic study being conducted as part of a Postgraduate dissertation within the PS7112 Psychology Conversion MSc module.

Why have I been chosen?

You have been chosen for the following reasons: You are a student at the University of Chester, you are a friend or family member, you are over 18 years of age and you have normal or corrected vision/hearing.

Do I have to take part?

It is up to you to decide whether or not to take part, all participation is voluntary. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. All data is anonymous and you are free to withdraw at any time before you hand in your response sheet at the end of this study. This will not affect your rights in any way and these rights will be outlined on a Debrief Information Sheet, which will be provided to you following the completion of the study. You do not have to answer all of the questions. If this is the case, please select the option “Prefer not to say”. These questions will not be included in any subsequent analysis.

What will happen to me if I take part?

The duration of the study will be no longer than 30 minutes. You will be presented with 8 video clips, all of a forensic nature; e.g. involving a police interview of a serious crime. All videos will reflect real life individuals in a high stakes situation and all content will be the same as those shown on a general news programme. Upon watching each clip, you will be asked to complete the response sheet provided accordingly, identifying whether the individual in the video clip is lying or telling the truth. Two other options will be included, regarding your familiarity with the case presented and if you would prefer not to answer the question. Alongside this, you will be asked to rate how confident you are in your decision on a scale of 1-5 and finally, you will be asked to explain how you arrived at your decision. No personal information will be collected, your data will not be stored alongside your consent form so you cannot be identified throughout

the study and hereafter. If you have any questions before, during or after the study, please do not hesitate to ask.

What are the possible disadvantages and risks of taking part?
All of the video clips included in the current study are taken from real life situations, some of which you may find distressing. Whether you are familiar with any of these cases or not, they may evoke some negative emotions due to their intense nature. If this is the case, you may be at a slight risk of feeling upset, anxious or unhappy following the completion of this study. Also, you may feel a slight sense of pressure respective of detecting deception accurately. However, before you begin I will talk you through anything you are unsure about and you will receive a full debrief at the end of the study.

What are the possible benefits of taking part?
If you are a Psychology student at the University of Chester you will receive 2 RPS credits for your time. Not only this, you will contribute to a fruitful area of research, which will hopefully one day provide information for the establishment of key behaviours displayed by liars, aiding professional lie detectors, i.e. judicial or law enforcement personnel.

What if something goes wrong?
If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact Dr. Clea Wright, co-applicant and supervisor for the current study: Department of Psychology, Room CCR101c, University of Chester, Parkgate Road, Chester, CH1 4BJ. Telephone: 01244 511984. Email: clea.wright@chester.ac.uk.

Will my taking part in the study be kept confidential?
No personal data will be collected meaning all data will be anonymous. You cannot be identified during or after the completion of this study.

What will happen to the results of the research study?
The results will be written into a postgraduate dissertation. Participants will not be identified in any report or publication.

Who is organising and funding the research?
The research is organized and conducted by a postgraduate Psychology student of the Department of Psychology at the University of Chester. Dr. Clea Wright will act as a co-applicant for the study and be on hand to supervise throughout. The research is receiving no funding.

Who may I contact for further information?
If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

Thank you for your interest in this research.

How to catch a liar: The effects of channels of communication on the accuracy of deception detection

Consent Form

If you would like to participate in the study and have read the participant information sheet, please read and sign this consent form.

Please tick the boxes below to confirm that you have understood the above and agree to participate in the research.

I have read the information sheet and consent to take part in the study. ☐

I understand that I can withdraw from the study at any time during the experiment and can choose to withdraw my data from the study up until the time where data is anonymised. ☐

I understand that my contributions will be used as part of a research project and that the researcher and research supervisor will have access to the data I provide. Apart from this, all data will be kept anonymous to maintain full participant confidentiality. ☐

Name (print) .....

Signature .....

Date .....

University of Chester

How to catch a liar: The effects of channels of communication on the accuracy of deception detection.

Participant Response Sheet

You will now be presented with 8 video clips, all involving different real life high-stake situations of a forensic nature. Please answer the following questions to the best of your ability. For question 1) please tick the box. For question 2) please circle a number on the scale. For question 3) please just write down anything you think is relevant. If you are familiar with any of the cases presented, please select the option 'Familiar with the Case'. If you would prefer not to answer a question, please select the "Prefer not to say" option provided and leave any other answers blank. If you change your mind for any question, please just cross it out and highlight your new answer.

Video 1

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*		*Very confident*

3. **Please outline how you came to this decision**

Video 2

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*		*Very confident*

3. **Please outline how you came to this decision**

Video 3

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*		*Very confident*

3. **Please outline how you came to this decision**

Video 4

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*		*Very confident*

3. **Please outline how you came to this decision**

Video 5

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*		*Very confident*

3. **Please outline how you came to this decision**

Video 6

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*		*Very confident*

3. **Please outline how you came to this decision**

Video 7

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. **How confident are you with your decision?**

1	2	3	4	5
Not confident at all		*Quite confident*	*Very confident*	

3. **Please outline how you came to this decision**

Video 8

1. **Do you believe the person in the video is:**

   Lying

   Telling the Truth

   Familiar with the case

   Prefer not to say

2. How confident are you with your decision?

1 2 3 4 5

Not confident at all *Quite confident* *Very confident*

3. Please outline how you came to this decision.

This is the end of the Response Sheet. Thankyou for answering these questions. You may now hand this back to the researcher. Please be aware, you cannot withdraw your participation once this is handed in as your data is anonymous and therefore cannot be identified by the researcher.

How to catch a liar: The effects of channels of communication on the accuracy of deception detection. Debrief Information

Thank you for taking part in this study, I hope that you enjoyed the experience.

This study examined how accurate your judgments of deception are based on the channel of behaviour/communication you were presented with. You were randomly allocated to participate in one of three conditions; 1) audio and visual information presented, 2) visual information only or 3) auditory information only. The current study focused on real-life high stake situations, involving both liars and truth-tellers, thus involving potentially high levels of negative emotions i.e. distress or anxiety and a high level of risk for the individuals involved within the high-stake situation presented. The data collected from you today will be included in the current study and will allow us to investigate whether levels of accuracy are similar to those of previous findings, and potentially establish which channel of communication is most effective in providing accurate detection levels of deception.

Not only this, the findings from the current study will further research in hopefully determining key behaviours displayed by a high-stake liar to aid future research, in potentially helping non-professional lie detectors improve in their deception detection levels. In addition, this data may potentially be applicable in future forensic settings, with the study being replicated with judicial or law enforcement personnel.

Data involving your decisional justification regarding who was lying and who was telling the truth will provide an insight into what aspects of behaviour/communication people rely on, and whether this is based on previous ideas as to what behaviours are perceived to be typical of a high stake liar.

Just to reiterate, **no** elements of personal data have been collected today and all data with the current study is **anonymous**. For this reason, you are now **unable** to withdraw your participation from the current study.

If you have any further questions or feel you require further support please do not hesitate to contact either me: or the co-applicant and supervisor for the current study: Dr. Clea Wright, Telephone: 01244 511984. Email: clea.wright@chester.ac.uk. If you are a student at the University of Chester, you can contact Student Support and Guidance on 01244 511550 or student.welfare@chester.ac.uk, or your PAT for additional support. If you are not a student at the University of Chester for further support you can contact the Samaritans on 116 123 or jo@samaritans.org or your GP.

How to catch a liar: The effects of channels of communication on the accuracy of deception detection.

Social Media/ Email Invitation

Are you interested in taking part in observational methods used to catch criminals by law enforcement personnel? This post/email is being sent to you as an invitation to participate in a research study being conducted as part of a compulsory research dissertation for submission towards a Psychology MSc degree. The current study will examine the effects of channels of behaviour/communication on the accuracy of deception detection (i.e. speech, non-verbal cues). Essentially, this study will aim to explore how well individuals can differentiate between liars and truth-tellers by focusing on different elements of individual behaviour (for example: body language, limb movement, facial expressions, use of language, etc.). Any participation is voluntary and would be at your convenience. You would only have to participate once and the visit would take no longer than 30 minutes. All information will be kept anonymous and treated with full confidentiality, only being used for the purpose of this dissertation.

If you are interested and would like to take part, or simply have any questions about what the study would entail, do not hesitate to contact me.

Thankyou in advance to anybody who signs up to participate, it is really appreciated!

ETHICS COMMITTEE DATE Click here to enter a date.

☑ **ACCEPTABLE**

You may now commence data collection subject to approval from any relevant external agencies.

CHAIRS COMMENTS

☐ **Read and review all reviewers comments**

DATA COLLECTION IS NOT PERMISSABLE UNDER THE FOLLOWING 3 CONDITIONS. Please address the issues indicated.

☐ **ACCEPTABLE SUBJECT TO SUBMISSION OF AMENDMENT FORM**

UG and PG students should discuss any recommendations with their supervisors.

☐ **ACCEPTABLE SUBJECT TO CONDITIONS OF CHAIR**

Resubmit application for full review after addressing the issues described, ensuring you have indicated on the front page of the form that this is a resubmission.

☐ **REVISE AND RESUBMIT**

Resubmit application for full review ensuring you have indicated on the front page of the form that this is a resubmission

SIGNATURE: Click here to enter text.

University of Chester

DEPARTMENT OF PSYCHOLOGY
ETHICS REVIEW FORM

When completing this form, please highlight the appropriate response to each question (e.g. underline, italicise, delete unwanted responses). Make any comments that you feel should be raised either next to each section or at the end in the general comments box.

Name of applicant: [redacted]

Project title: How to catch a liar: The effects of channels of communication on the accuracy of deception detection

Applicant status: UG PGT PGR Staff

1. **Has the applicant signed and dated the form?**
   a) Yes / No → Return to applicant for signature before continuing with review process.

2. **What is the submission type?**
   a) First submission to this or any other committee? Yes / No

   b) Resubmission of a rejected application by this committee
      - Is there a summary of the requirements of the committee and is the original application attached? Yes / No→ Return to applicant for full details

   c) Revised submission intended to replace an application approved by this committee
      - Is the original application attached?: Yes / No→ Return to applicant for full details

   d) First submission to this committee; has been submitted to another committee.
      - Is the original application attached? Yes / No→ Return to applicant for full details

3. **Research Plan and Methodology (Qu 4, 6 & 7)**
   a) Are the timescales provided appropriate?
   Yes / No Comments:

   b) Are there contingency details?
   Yes / No Comments:

   c) Is the study well formulated in terms of drawing on the relevant literature and is it methodologically, analytically and scientifically sound?
   Yes / No Comments:

   d) Are appropriate debrief details provided?
   Yes / No Comments:

   e) Has the applicant provided appropriate details of where the research will take place?
   Yes / No Comments:

   f) Has the applicant provided appropriate details concerning data analysis?
   Yes / No Comments:

4. Ethical Issues (Qu 9)

a) Is there consideration of how to minimise, manage and monitor issues of distress and harm, however minor?
Yes / No Comments:

b) Are appropriate details regarding the use and management of deception provided?
Yes / No / N/A Comments:

c) Has the applicant provided appropriate details including regarding permission and appropriate health and safety information for conducting the study at the proposed location? Is the necessary documentation attached?
Yes / No Comments:

d) Has the applicant provided an appropriate overview of how they would manage participant distress?
Yes / No / N/A (online study) Comments:

5. Sample size, participants and recruitment (Qu 10 – 14)

a) Has the applicant provided appropriate details of the sample and how it will be identified?
Yes / No Comments:

b) If using social media for recruitment have details been provided on

a. Proposed sites

Facebook ☐
Twitter ☐
Instagram ☐
Other, please Specify
Comments:

b. Social media messages?

Facebook ☐
Twitter ☐
Instagram ☐
Other, please Specify
Comments: I think that the social media message is too long for Twitter?

c) Has the applicant provided appropriate details and attached the necessary documentation concerning their recruitment procedures? In particular, have they appropriately considered how to minimise, manage and monitor issues of distress and harm during recruitment?
Yes / No Comments:

d) Are there appropriate details on the information sheet regarding the following (if applicable):

- Purpose of the study Yes / No / N/A
- Explanation of why participant has been chosen Yes / No / N/A
- Details of materials/stimuli/qualitative topics Yes / No / N/A
- Notification that materials used in the study are not diagnostic tools/therapy Yes / No / N/A
- Notification that participation is voluntary Yes / No / N/A
- Incentives/Compensation Yes / No / N/A
- Informed consent Yes / No / N/A
- Procedure Yes / No / N/A
- Time commitment Yes / No / N/A

- Right to not answer questions — Yes / No / N/A
- Withdrawal — Yes / No / N/A
- How partially collected data will be used — Yes / No / N/A
- Benefits and risks of participating — Yes / No / N/A
- Anonymity — Yes / No / N/A
- Confidentiality — Yes / No / N/A
- Dissemination information — Yes / No / N/A

6. Dissemination (Qu15)

a) Has the applicant provided appropriate details concerning research dissemination?
Yes / No Comments:

b) Are there appropriate details regarding any specific considerations about sharing the research?
Yes / No Comments:

7. Participant payments and inducements (Qu16)

a) Are there appropriate details regarding compensation arrangements?
Yes / No / N/A Comments:

8. Debrief (Qu17)

a) Are appropriate debrief details provided?
Yes / No / N/A Comments:

b) Are there appropriate details about how participants will be debriefed should they decide to withdraw from an online study?
Yes / No / N/A (not online study) Comments:

9. Data Security (Qu18)

a) Has the applicant provided appropriate details concerning data protection and storage?
Yes / No Comments:

b) Have security issues been properly considered?
Yes / No Comments:

c) Are there appropriate details regarding how privacy and confidentiality will be maintained during dissemination?
Yes / No Comments:

10. Forum-based projects

a) Is the content of the website openly accessible?
Yes / No Comments:

b) Has the applicant discussed what will happen with users who expressly state that they do not wish their responses to be used for research purposes?
Yes / No Comments:

c) Has the applicant explained how online data collected will be anonymized?
Yes / No Comments:

d) Has the applicant explained process of access, should the host website require posts to be posted through moderators

Yes / No Comments:

e) Has the applicant detailed how, where appropriate, they will ensure that age limits are met?
Yes / No Comments:

General comments: A thorough application. The PIS is a bit long, and Twitter script is too long, but these are minor issues that I am happy to oversee.

Review status (please highlight one of the following):

Chair's action
Staff/PGR for full review
UG/PGT for full review
Work with external agencies
Work with vulnerable participants
Other issues/concerns

NAME: Clea Wright

ROLE: Supervisor / Reviewer 1 / Reviewer 2

DATE: 17.04.2018

University of Chester

DEPARTMENT OF PSYCHOLOGY
ETHICS REVIEW FORM

When completing this form, please highlight the appropriate response to each question (e.g. underline, italicise, delete unwanted responses). Make any comments that you feel should be raised either next to each section or at the end in the general comments box.

Name of applicant: [redacted]

Project title: How to catch a liar: the effects of channels of communication on the accuracy of deception detection.

Applicant status: PGT

1. **Has the applicant signed and dated the form?**
   a) Yes → Return to applicant for signature before continuing with review process.

2. **What is the submission type?**

a) First submission to this or any other committee? Yes

b) Resubmission of a rejected application by this committee

- Is there a summary of the requirements of the committee and is the original application attached? Yes / No→ Return to applicant for full details

c) Revised submission intended to replace an application approved by this committee

- Is the original application attached?: Yes / No→ Return to applicant for full details

d) First submission to this committee; has been submitted to another committee.

- Is the original application attached? Yes / No→ Return to applicant for full details

3. **Research Plan and Methodology (Qu 4, 6 & 7)**
   a) Are the timescales provided appropriate?
   Yes Comments:

   b) Are there contingency details?
   Yes Comments:

   c) Is the study well formulated in terms of drawing on the relevant literature and is it methodologically, analytically and scientifically sound?
   Yes Comments:

   d) Are appropriate debrief details provided?
   Yes Comments:

   e) Has the applicant provided appropriate details of where the research will take place?
   No Comments: Student states that they may use an alternative location to run the experiment. More details on this are needed before approval could be given.

   f) Has the applicant provided appropriate details concerning data analysis?
   Yes Comments:

4. Ethical Issues (Qu 9)

a) Is there consideration of how to minimise, manage and monitor issues of distress and harm, however minor?
Yes Comments:

b) Are appropriate details regarding the use and management of deception provided?
Yes Comments:

c) Has the applicant provided appropriate details including regarding permission and appropriate health and safety information for conducting the study at the proposed location? Is the necessary documentation attached?
Yes Comments:

d) Has the applicant provided an appropriate overview of how they would manage participant distress?
Yes Comments:

5. Sample size, participants and recruitment (Qu 10 – 14)

a) Has the applicant provided appropriate details of the sample and how it will be identified?
Yes Comments:

b) If using social media for recruitment have details been provided on

a. Proposed sites
Facebook ☐
Twitter ☐
Instagram ☐
Other, please Specify
Comments:

b. Social media messages?
Facebook ☐
Twitter ☐
Instagram ☐
Other, please Specify
Comments:

c) Has the applicant provided appropriate details and attached the necessary documentation concerning their recruitment procedures? In particular, have they appropriately considered how to minimise, manage and monitor issues of distress and harm during recruitment?
Yes Comments:

d) Are there appropriate details on the information sheet regarding the following (if applicable):

- Purpose of the study Yes
- Explanation of why participant has been chosen Yes
- Details of materials/stimuli/qualitative topics Yes
- Notification that materials used in the study are not diagnostic tools/therapy N/A
- Notification that participation is voluntary Yes
- Incentives/Compensation Yes
- Informed consent Yes
- Procedure yes
- Time commitment Yes

- Right to not answer questions — Yes
- Withdrawal — Yes
- How partially collected data will be used — No
- Benefits and risks of participating — Yes
- Anonymity — Yes
- Confidentiality — Yes
- Dissemination information — Yes

6. Dissemination (Qu15)

a) Has the applicant provided appropriate details concerning research dissemination?
Yes Comments:

b) Are there appropriate details regarding any specific considerations about sharing the research?
Yes Comments:

7. Participant payments and inducements (Qu16)

a) Are there appropriate details regarding compensation arrangements?
Yes Comments:

8. Debrief (Qu17)

a) Are appropriate debrief details provided?
Yes Comments:

b) Are there appropriate details about how participants will be debriefed should they decide to withdraw from an online study?
N/A (not online study) Comments:

9. Data Security (Qu18)

a) Has the applicant provided appropriate details concerning data protection and storage?
No Comments:

b) Have security issues been properly considered?
No Comments:

c) Are there appropriate details regarding how privacy and confidentiality will be maintained during dissemination?
Yes Comments:

10. Forum-based projects

a) Is the content of the website openly accessible?
Yes / No Comments:

b) Has the applicant discussed what will happen with users who expressly state that they do not wish their responses to be used for research purposes?
Yes / No Comments:

c) Has the applicant explained how online data collected will be anonymized?
Yes / No Comments:

d) Has the applicant explained process of access, should the host website require posts to be posted through moderators

Yes / No Comments:

e) Has the applicant detailed how, where appropriate, they will ensure that age limits are met?
Yes / No Comments:

General comments:

Please encourage student to adhere to word count. It makes it much more difficult to find information when the student has written 3 times the allowed count.

Review status (please highlight one of the following):

Chair's action
Staff/PGR for full review
UG/PGT for full review
Work with external agencies
Work with vulnerable participants
Other issues/concerns *PASS WITH MINOR REVISIONS*

NAME: Mandy Urquhart

ROLE: Reviewer 1

DATE: 17-April-2018

B. SPSS Outputs

	modality	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Average Accuracy Score	Audio-visual	.142	20	.200*	.924	20	.116
	Visual-only	.130	20	.200*	.954	20	.428
	Audio-only	.157	20	.200*	.941	20	.250
Average Confidence Ratings	Audio-Visual	.097	20	.200*	.984	20	.975
	Visual-Only	.112	20	.200*	.962	20	.581
	Audio-Only	.150	20	.200*	.937	20	.206

Tests of Normality

*.lower bound of true significance

a. Lilliefors Significance Correction

Homogeneity of Variance
Average Accuracy Scores

Levene Statistic	df1	df2	Sig.
.264	2	57	.769

Descriptives
Average Accuracy Scores

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Audio-Visual	20	57.225	19.7961	4.4265	47.960	66.490	28.5	87.5
Visual-Only	20	55.620	18.4371	4.1227	46.991	64.249	25.0	87.5
Audio-Only	20	52.155	19.8121	4.4301	42.883	61.427	20.0	83.3
Total	60	55.000	19.1475	2.4719	50.054	59.946	20.0	87.5

T-Test Overall Data Set

Average Accuracy Scores
One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Average Accuracy Score	60	55.000	19.1475	2.4719

One-Sample Test

	Test Value= 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Average Accuracy Scores	2.023	59	.048	5.0000	.054	9.946

ANOVA Overall Data Set

Average Accuracy Score Between Communicative Channels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	268.581	2	134.290	.358	.700
Within Groups	21362.367	57	374.778		
Total	21630.948	59			

Homogeneity of Variance
Average Confidence Ratings

Levene Statistic	df1	df2	Sig.
.178	2	57	.837

Descriptives
Average Confidence Ratings

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Audio-Visual	20	3.37	.576	.129	3.10	3.64	2	5
Visual-Only	20	3.17	.590	.132	2.89	3.44	2	4
Audio-Only	20	3.25	.594	.133	2.97	3.53	2	5
Total	20	3.26	.583	.075	3.11	3.41	2	5

ANOVA Overall Data Set

Average Confidence Ratings Between Communicative Channels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.402	2	.201	.584	.561
Within Groups	19.623	57	.344		
Total	20.026	59			

Pearson's Correlation
Relationship between Overall Average Accuracy Scores and Average Confidence Ratings

		Average Accuracy Scores	Average Confidence Ratings
Average Accuracy Scores	Pearson Correlation	1	.104
	Sig. (2-tailed)		.428
	N	60	60
Average Confidence Ratings	Pearson Correlation	.104	1
	Sig. (2-tailed)	.428	
	N	60	60

Pearson's Correlation
Relationship between Accuracy and Confidence in Audio-Visual Channel

		Average Accuracy Scores	Average Confidence Ratings
Average Accuracy Scores	Pearson Correlation	1	.086
	Sig. (2-tailed)		.718
	N	20	20
Average Confidence Ratings	Pearson Correlation	.086	1
	Sig. (2-tailed)	.718	
	N	20	20

Pearson's Correlation
Relationship between Accuracy and Confidence in Visual-Only Channel

		Average Accuracy Scores	Average Confidence Ratings
Average Accuracy Scores	Pearson Correlation	1	.247
	Sig. (2-tailed)		.293
	N	20	20
Average Confidence Ratings	Pearson Correlation	.247	1
	Sig. (2-tailed)	.293	
	N	20	20

Pearson's Correlation
Relationship between Accuracy and Confidence in Visual-Only Channel

		Average Accuracy Scores	Average Confidence Ratings
Average Accuracy Scores	Pearson Correlation	1	-.240
	Sig. (2-tailed)		.308
	N	20	20
Average Confidence Ratings	Pearson Correlation	-.240	1
	Sig. (2-tailed)	.308	
	N	20	20

C. Content Analysis

Content Analysis (Condition 1. Audio-Visual)

Participant	Free Report Deceptive Cues Reported	Themes	Potential Categories
1.	▪ Fake Crying ▪ Seemingly unbothered about crime ▪ More concerned with being accused ▪ Speech repetitions	▪ Fake Emotion ▪ Verbal Avoidance ▪ Directing focus on the self ▪ Speech Errors	▪ Emotions ▪ Verbal Information/ Characteristics
2.	▪ Loss of breath ▪ Irrelevant questions ▪ Odd hand positions ▪ Fidgeting ▪ Lack of Cleanliness-Clothing ▪ Disturbed Sentences ▪ Inconsistent story ▪ Fake Emotion ▪ No eye contact ▪ Race/Prejudice ▪ Pauses in speech ▪ Creating excuses	▪ Nervous Behaviours ▪ Verbal Avoidance ▪ Body Language ▪ Speech Errors ▪ Plausibility ▪ Fake Emotions ▪ Eye Aversion ▪ Other	▪ Emotions ▪ Verbal Information/ Characteristics ▪ Eyes ▪ Body Language
3.	▪ Crying to distract ▪ Covering face ▪ Speech not convincing ▪ Excessive hand gestures ▪ Lack of surprise at situation ▪ Immediate emotion ▪ No questions asked ▪ No eye contact ▪ Heavy Breathing ▪ Fiddling with fingers ▪ Mumbling ▪ Not enough distress	▪ Fake Emotion ▪ Face Covering ▪ Plausibility ▪ Arm/Hand Movements ▪ Lack of Emotion ▪ Verbal Avoidance ▪ Eye Aversion ▪ Nervous Behaviours	▪ Emotions ▪ Body Language ▪ Verbal Information/ Characteristics ▪ Eyes
4.	▪ More concerned with irrelevant details ▪ No hysterical reaction to serious news ▪ Faking ▪ Controlled emotions ▪ Heavy breathing	▪ Verbal Avoidance ▪ Lack of Emotion ▪ Fake Emotion ▪ Nervous Behaviours	▪ Verbal Information/ Characteristics ▪ Emotions ▪ Body Language
5.	▪ High levels of emotion ▪ No eye contact ▪ Becoming defensive ▪ Focusing more on personal accusations than crime ▪ Focus on irrelevant details	▪ Genuine Emotion ▪ Eye Aversion ▪ Directing focus on self ▪ Verbal Avoidance	▪ Emotions ▪ Eyes ▪ Verbal Information
6.	▪ No eye contact ▪ Repetition of speech ▪ Lack of consistency in story ▪ Facial expressions ▪ Fidgeting	▪ Eye Aversion ▪ Speech Errors ▪ Plausibility ▪ Body Language	▪ Eyes ▪ Verbal Information ▪ Body Language
7.	▪ High Pitched Voice ▪ Fiddling ▪ Instant Crying ▪ Overdramatic ▪ Irrelevant questions ▪ Controlled sense of emotion ▪ No real tears	▪ Pitch ▪ Nervous Behaviours ▪ Fake Emotion ▪ Verbal Avoidance ▪ Lack of Emotion ▪ Eye Aversion	▪ Vocal Features ▪ Body Language ▪ Emotions ▪ Verbal Information ▪ Eyes

	▪ Impersonal reference to the victim ▪ No eye contact		
8.	▪ Too quick to respond ▪ Head down ▪ Excessive use of hand and arm movements ▪ Practised/Rehearsed Speech ▪ Lack of contribution from other present family members	▪ Fake Emotion ▪ Body Language ▪ Speech Errors ▪ Other	▪ Emotions ▪ Body Language ▪ Verbal Information ▪ Other
9.	▪ Fake Crying ▪ Irrelevant questions ▪ Lack of emotion-wasn't shocked at news ▪ Stuttering in speech ▪ Repetition in speech ▪ Sweating ▪ Inconsistent story ▪ Not making eye contact with others present or with camera	▪ Fake Emotion ▪ Verbal Avoidance ▪ Lack of Emotion ▪ Speech Errors ▪ Nervous Behaviours ▪ Plausibility ▪ Eye Aversion	▪ Emotions ▪ Verbal Information ▪ Eyes
10.	▪ Did not stick up for self very well ▪ Lack of plausibility ▪ Repetition in speech ▪ Fake emotion ▪ Heavy breathing ▪ Pauses in speech ▪ Inclusion of irrelevant details	▪ Verbal Avoidance/Distance ▪ Plausibility ▪ Speech Errors ▪ Fake Emotion ▪ Nervous Behaviours	▪ Verbal Information ▪ Emotions ▪ Body Language
11.	▪ Protests innocence too much ▪ Fake crying ▪ Heavy breathing ▪ Mumbling ▪ Appears too calm ▪ Body Language	▪ Directing focus on self ▪ Fake Emotion ▪ Nervous Behaviours ▪ Speech Errors ▪ Lack of Emotion ▪ Body Language	▪ Verbal Information ▪ Emotions ▪ Body Language
12.	▪ Voice ▪ Blames media for interest as a suspect ▪ Becomes defensive, paints themselves as the victim	▪ Voice ▪ Directing focus on self	▪ Vocal features ▪ Verbal Information
13.	▪ Babbling ▪ Does not seem to genuinely care ▪ Forced emotion ▪ Lack of emotion ▪ Appearance/Prejudice	▪ Speech Errors ▪ Lack of Emotion ▪ Fake Emotion ▪ Appearance	▪ Verbal Information ▪ Emotion ▪ Other
14.	▪ High Pitched voice ▪ Facial expressions ▪ Shoulders hunched-seems tense ▪ Appears cool and calm ▪ Omits information, seems to leave out details ▪ Forced shaking of voice ▪ Lack of contribution from other present family members ▪ No remorse ▪ No eye contact	▪ Voice ▪ Facial Expressions ▪ Body Language ▪ Lack of Emotion ▪ Verbal Avoidance ▪ Fake Emotion ▪ Eye Aversion	▪ Vocal Features ▪ Body Language ▪ Emotions ▪ Verbal Information ▪ Eyes
15.	▪ Hinting at details but does not provide clear information	▪ Verbal Avoidance ▪ Speech Errors ▪ Body Language	▪ Verbal Information ▪ Body Language

	▪ Appears unnatural/rehearsed ▪ Overzealous hand and facial movements/expressions ▪ Immediately in denial, justifying self	▪ Directing focus on self	
16.	▪ Covering face ▪ Fake crying ▪ No questions asked ▪ Irrelevant questions ▪ Lack of emotion ▪ Lack of contribution from other present family members	▪ Facial Blocking ▪ Fake Emotion ▪ Verbal Avoidance ▪ Lack of Emotion ▪ Family members	▪ Body Language ▪ Emotions ▪ Verbal Information ▪ Other
17.	▪ Hysterical-seems fake ▪ Rigid body language ▪ Hands shaking-nerves ▪ Crying but no shaking of the voice ▪ Eye Aversion	▪ Fake Emotion ▪ Body Language ▪ Nervous Behaviour ▪ Eye Aversion	▪ Emotions ▪ Body Language ▪ Eyes
18.	▪ Delayed reactions ▪ Irrelevant questions ▪ Reactions seem fake ▪ No eye contact ▪ Hesitations in speech ▪ Appear too relaxed ▪ Facial expressions-look like they are concentrating too much	▪ Lack of emotion ▪ Verbal Avoidance ▪ Fake Emotion ▪ Eye Aversion ▪ Speech Errors ▪ Facial Expression	▪ Emotions ▪ Verbal Information ▪ Eyes ▪ Body Language
19.	▪ Instant denial ▪ Lack of recollection-has to think about what to say ▪ Inconsistencies in story ▪ Shortness of breath ▪ Fake crying ▪ Lack of contribution from other family member ▪ Blinking too much	▪ Directing focus on the self ▪ Plausibility ▪ Nervous behaviours ▪ Fake emotion ▪ Family members ▪ Eye movements	▪ Verbal Information ▪ Body Language ▪ Emotions ▪ Other ▪ Eyes
20.	▪ Story remains unclear ▪ Appear to be overcompensating ▪ Fake emotions ▪ More concerned with accusations against them	▪ Plausibility ▪ Fake Emotion ▪ Directing focus on the self	▪ Verbal Information ▪ Emotions

GROUPING THEMES INTO FINAL CATEGORIES

1. **BODY LANGUAGE:** Head, Face, Arm/Hand, Nervous Behaviours, General
2. **EMOTION:** Fake Emotion, Lack of Emotion, Genuine Emotion
3. **EYES:** Eye Contact, Eye Movement
4. **VERBAL INFORMATION:** Speech Errors, Avoidance, Plausibility, Focus on Self
5. **VOCAL INFORMATION:** Pitch, Distinct Emotion
6. **OTHER:** General Appearance, Circumstance, Family

Content Analysis Condition 2 (Visual-Only)

Participant	Free Report Deceptive Cues Reported	Potential Themes	Potential Categories
21.	▪ Makes a very small amount of eye contact ▪ Fiddles with finger and tissue in hand ▪ Takes deep breaths as if trying to get upset ▪ Thinking about what to say ▪ Wipes eye with a tissue but no tears ▪ Does not seem genuine ▪ Lady has head down majority of time but no tears ▪ Looks rehearsed ▪ No constant eye contact ▪ Eyes looked all around and did not focus on anything ▪ Speaks too quickly	▪ Eye Aversion ▪ Fiddling-Nervous ▪ Heavy Breathing ▪ Increased Cognitive Load-Concentrated Expression ▪ Fake emotion ▪ Lack of emotion ▪ Head down ▪ Unnatural ▪ Eye Movements ▪ Speech rate	▪ Eyes ▪ Body Language ▪ Emotion ▪ Appearance of Speech
22.	▪ Putting on tears to get sympathy ▪ Not making eye contact ▪ Lady seemed upset but looked like man was putting it on ▪ Kept fiddling with ring on finger	▪ Fake Emotion ▪ Eye Aversion ▪ Fidgeting-Nervous Behaviour	▪ Emotions ▪ Eyes ▪ Body Language
23.	▪ Watching the clock while they are talking ▪ Looks upset but breathing is shallow. ▪ Body language ▪ Lack of eye contact ▪ Responses are staged ▪ No emotion shown in way you would expect ▪ Playing to what observers want to see	▪ Eye Movements ▪ Breathing-Nervous ▪ Fake emotion ▪ Body language ▪ Eye Aversion ▪ Lack of Emotion	▪ Eyes ▪ Body Language ▪ Emotion
24.	▪ Cannot maintain eye contact ▪ Fidgets a lot ▪ Rocks themselves back and forward	▪ Eye Aversion ▪ Fidgeting-Nervous Behaviour ▪ Rocking-Nervous Behaviour	▪ Eyes ▪ Body Language
25.	▪ Smug facial expression ▪ Rolling eyes ▪ Shrugging shoulders ▪ Looks disinterested ▪ Focusing attention on themselves ▪ Looking down at feet makes them seem untrustworthy	▪ Facial Expressions ▪ Eye Movements ▪ Body Movements/Language ▪ Directing focus on self ▪ Fiddling-Nervous ▪ Speech Rate ▪ Family members ▪ Head down ▪ Fake Emotion ▪ Head movement	▪ Body Language ▪ Eyes ▪ Appearance of Speech ▪ Emotion ▪ Other

	▪ Fiddling with hands may be to distract interviewer or shows nerves ▪ Talking slowly – appears calculated ▪ Woman does not speak and hangs her head- only appears to cry but man is constantly talking, moves his head a lot and doesn't look anybody in the eye. ▪ Seems dramatic and fake ▪ Shaking head a lot and constantly moving ▪ Pauses before answering every question ▪ Blinks a lot and twitches ▪ Looks around and at his feet a lot ▪ Speaks very quickly	▪ Disingenuous ▪ Speech dysfluency	
26.	▪ Seems disinterested ▪ Seemed nervous ▪ Not showing emotion ▪ Reactions seem fake ▪ Not showing emotion	▪ Facial Expressions ▪ Nervous Behaviour ▪ Lack of Emotion ▪ Fake Emotion	▪ Body Language ▪ Emotion
27.	▪ Keeps raising eyes to the left ▪ Can't make eye contact ▪ Taking deep breaths before each sentence	▪ Eye Movements ▪ Eye Aversion ▪ Heavy Breathing-Nervous	▪ Eyes ▪ Body Language
28.	▪ Scared/Shaking ▪ Walking really fast ▪ Not looking up ▪ Closed body language ▪ Fiddling with hands ▪ Crocodile tears ▪ Looks down a lot	▪ Shaking-Nervous Body Language ▪ Head Movements ▪ Fiddling-Nervous Body Language ▪ Fake Emotion	▪ Body Language ▪ Emotion
29.	▪ Seems very unsettled and flustered ▪ Seems restless and twitchy ▪ Looks nervous and scared ▪ Keeps looking away ▪ Fidgeting	▪ Facial Expressions ▪ Nervous Body Language ▪ Nervous Emotions ▪ Eye Movements	▪ Body Language ▪ Emotion ▪ Eyes
30.	▪ Keeps losing eye contact ▪ Movement of Hands ▪ Head Movement	▪ Eye Aversion ▪ Hands Movements-Body Language ▪ Head Movements-Body Language	▪ Eyes ▪ Body Language

31.	▪ Lack of body movement ▪ Tears seem fake ▪ Trying too hard to look upset that they forget about body ▪ Story seems pre-planned and rehearsed ▪ Lack of emotion ▪ Reminded of a serial killer with no empathy ▪ Husband slightly smirking, seems easily distracted/Wife doesn't show a lot of emotion and is very neutral ▪ Blinking a lot	▪ Lack of Movement ▪ Fake Emotion ▪ Too much effort-increased cognitive load, concentration ▪ Rehearsal/Unnatural ▪ Lack of emotion ▪ Family members ▪ Increased Eye Movements	▪ Body Language ▪ Emotion ▪ Appearance of Speech ▪ Eyes ▪ Other
32.	▪ Very defensive ▪ Emotions are not genuine ▪ Overly upset and shocked ▪ Fidgeting ▪ Playing with hands ▪ Seemed on edge and trying to hide something ▪ Staring at lap ▪ Forced emotions ▪ Constantly looking down, trying to hide face	▪ Directing focus on self ▪ Disingenuous ▪ Fake emotions ▪ Fidgeting-Nervous Body Language ▪ Nervous Behaviours ▪ Eye Movements ▪ Eye Aversion ▪ Head Movements ▪ Lack of Emotion	▪ Appearance of Speech ▪ Emotion ▪ Body Language ▪ Eyes
33.	▪ Nervous and shaky ▪ Looked like they were trying hard to change the officer's mind ▪ Looked very nervous ▪ Twiddling thumbs ▪ Breathing heavily ▪ Looking down ▪ Blinking excessively ▪ Eyes darting all over the room	▪ Nervous body language ▪ Cognitive load ▪ Fidgeting ▪ Heavy breathing ▪ Head movements ▪ Eye movements	▪ Body Language ▪ Eyes
34.	▪ Calm demeanour ▪ Rapid eye movements ▪ Avoiding eye contact ▪ Frequent blinking ▪ Face expressionless ▪ Looks like they are carefully considering answers ▪ Rapid breathing ▪ Hand gestures ▪ Keeps looking at clock ▪ Appears distressed ▪ Wringing hands ▪ Shallow breathing ▪ Man is emotionless,	▪ Lack of body movement ▪ Eye movements ▪ Eye aversion ▪ Facial expressions ▪ Cognitive load ▪ Breathing rate ▪ Hand movements ▪ Facial expressions ▪ Lack of emotion ▪ Fidgeting/Fiddling	▪ Body Language ▪ Eyes ▪ Emotion

	doesn't say anything, cold ▪ Fidgeting with wedding ring ▪ Running hands through their hair		
35.	▪ Emotions look exaggerated ▪ Very composed-speaking a lot ▪ Does not think about what they have to say-Rehearsed/Unnatural ▪ Looks uncomfortable and on edge ▪ Looks fake ▪ Hiding behind hand	▪ Fake emotion ▪ Lack of emotion ▪ Speech rate ▪ Rehearsed/Unnatural ▪ Facial Expressions ▪ Face Covering	▪ Emotion ▪ Appearance of Speech ▪ Body Language
36.	▪ Asking for ways they can prove innocence-looking for scapegoat ▪ Hand on head ▪ Too quick to react-bursts into tears instantly ▪ Fidgeting ▪ Can't make eye contact ▪ Heads down ▪ No real emotion	▪ Directing focus on self ▪ Hand position/movement ▪ Fake emotion ▪ Fidgeting ▪ Eye Aversion ▪ Head Movement ▪ Lack of emotion	▪ Appearance of Speech ▪ Body Language ▪ Emotion ▪ Eyes
37.	▪ No empathy behind their eyes ▪ No emotion ▪ Seems switched off ▪ Appears robotic ▪ Crocodile tears ▪ Crying is overdramatic ▪ Hiding face with hair ▪ Lack of eye contact ▪ Fidgeting ▪ Shaking of head	▪ Lack of emotion ▪ Facial Expressions ▪ Distance from situation ▪ Lack of body movement ▪ Fake Emotion ▪ Covering face ▪ Eye Aversion ▪ Fidgeting ▪ Head Movement	▪ Emotion ▪ Body Language ▪ Eyes
38.	▪ Over theatrical ▪ Wiping eyes with no tears ▪ Pretending to look distraught ▪ Lack of real emotion ▪ Not making eye contact ▪ Keeps looking up ▪ Indirect communication ▪ Wringing hands ▪ Insincere emotions and responses ▪ Body language evasive ▪ Keeps looking away ▪ Would look more upset if telling the truth ▪ Seems agitated	▪ Fake Emotion ▪ Lack of Emotion ▪ Eye Aversion ▪ Eye Movement ▪ Distance from situation ▪ Hand gestures/movement ▪ Disingenuous ▪ Body language ▪ Facial Expressions ▪ Body Movement	▪ Emotion ▪ Eyes ▪ Body Language
	▪ Blinking a lot ▪ Moves head a lot	▪ Eye Movements ▪ Head Movements	▪ Eyes ▪ Body Language

39.	▪ Seems generally awkward ▪ Doesn't look up ▪ Constantly fidgeting with fingers ▪ Reactions seemed forced ▪ Eye Movements- always looking around ▪ Seems unconfident	▪ Body Language ▪ Fidgeting ▪ Fake Emotion ▪ Facial Expressions	▪ Emotion
40.	▪ Didn't keep eye contact ▪ Shifting stance ▪ Looking around when talking ▪ Fidgeting with hands ▪ Looking down	▪ Eye Aversion ▪ Body Language ▪ Eye Movement ▪ Fidgeting ▪ Head Movement/Position	▪ Eyes ▪ Body Language

GROUPING THEMES INTO FINAL CATEGORIES

1. **BODY LANGUAGE:** Head, Face, Arm/Hand, Body, Nervous Behaviours, General
2. **EMOTION:** Fake Emotion, Lack of Emotion, Disingenuous
3. **EYES:** Eye Contact, Eye Movement
4. **APPEARANCE OF SPEECH:** Rate of Speech, Pauses, Rehearsed/Unnatural
5. **OTHER:** Family Members

Content Analysis Condition 3 (Audio-Only)

Participant	Self-Report Deceptive Cues Reported	Potential Themes	Potential Categories
41.	▪ Overreaction ▪ Putting on tears ▪ Sounded fake	▪ Forced Emotion ▪ Dramatised to ensure credibility	▪ Emotion
42.	▪ Pleads Innocence ▪ Overly upset ▪ Giving elements of truth to seem believable but still hiding something ▪ Changes tone when talking about missing person ▪ Quick to dispel allegations	▪ Attempt to convince innocence and ensure credibility ▪ Forced emotion ▪ Inconsistency ▪ Vocal changes-tone ▪ Distract from situation-focus more on allegations ▪ Focus on self	▪ Verbal Information ▪ Emotion ▪ Vocal Features
43.	▪ Sounded guilty ▪ Story doesn't seem right-seemed to change as they tell it ▪ Little emotion ▪ Doesn't care what people think of them	▪ Vocal Characteristics ▪ Plausibility ▪ Lack of emotion ▪ Disinterested	▪ Vocal Features ▪ Verbal Information ▪ Emotion
44.	▪ Stuttering ▪ Wasn't 100% confidence with the details they were giving ▪ Kept saying 'I think' ▪ Continuous crying ▪ Doesn't focus on person who is missing-focused more on family and how it has affected them. ▪ Stated 'first thing they think about when they go to sleep'-how can you sleep when your son is missing? ▪ Very defensive ▪ Swearing ▪ Was not appealing for help-more passing blame onto media	▪ Speech errors ▪ Inconsistency ▪ Unconfident ▪ Impersonal reference to victim ▪ Focus on self ▪ Violent language	▪ Verbal Information
45.	▪ Stated something 'wasn't his intention'-suggests they are guilty of whatever they have been accused ▪ Initially stated they had tied a victims legs and then backtracked saying later they were unsure if victims legs were tied-inconsistency ▪ Orderly attitude- as if he was reciting a rehearsed scenario	▪ Content of language ▪ Inconsistency ▪ General demeanour ▪ Rehearsed/Unnatural	▪ Verbal Information
46.	▪ Crying too quickly-too quick of a response ▪ Did not sound genuinely upset ▪ Felt guilty ▪ Overcompensating	▪ Forced emotion ▪ Insincere ▪ Unconfident-Vocal characteristics	▪ Emotion ▪ Vocal Features
47.	▪ Sounded scared ▪ Not very convincing ▪ Sounded very nervous	▪ Voice-general ▪ Language	▪ Vocal Features ▪ Verbal Information

48.	▪ Overreaction-acted like they had been caught out ▪ Sounded staged-like he was acting nervous	▪ Forced emotion ▪ Rehearsed/Unnatural	▪ Emotion ▪ Verbal Information
49.	▪ Very defensive ▪ Seems very upset ▪ Quite high pitched voice ▪ Was not sure of details in story ▪ Seemed quite 'put together' and rehearsed	▪ Violent language ▪ Vocal-Pitch ▪ Unconfident ▪ Inconsistent ▪ Rehearsed/Unnatural	▪ Verbal Information ▪ Vocal Features
50.	▪ Breathing seemed exaggerated ▪ Seemed forced ▪ Pattern in the tone of their voice ▪ Deliberately breathing loudly ▪ Over the top ▪ Sentences seemed unnatural ▪ Acting ▪ Keeps asking rhetorical questions as if he already knows answer but wants to give a different one ▪ Language seems violent	▪ Forced emotion ▪ Tone of voice-Vocal ▪ Unnatural/Rehearsed ▪ Language-Rhetorical Questions ▪ Deflection from situation-focusing on irrelevant questions	▪ Emotion ▪ Vocal Features ▪ Verbal Information
51.	▪ Very distressed and upset ▪ Very nervous in recall but claims to have done nothing wrong ▪ Dodgy responses ▪ Strange defensive language- "she always got what she wanted" ▪ No emotion in voice	▪ High levels of emotion ▪ Language (Strange/Violent) ▪ Lack of emotion	▪ Emotion ▪ Verbal Information
52.	▪ Over dramatic ▪ Trying to paint themselves in a better light by stating they will donate their child's organs. ▪ Blaming others to deflect situation from self.	▪ Forced emotion ▪ Focus on self ▪ Deflection from situation	▪ Emotion ▪ Verbal Information
53.	▪ Reaction is too sudden ▪ Didn't ask questions-what happened? Where did it happen? ▪ Couldn't remember events in detail ▪ Controlled emotion	▪ Forced emotion ▪ Disinterested ▪ Inconsistent ▪ Overcontrol-forced emotion	▪ Emotion ▪ Verbal Information
54.	▪ Crying sounds forced ▪ Voice is very high pitched-goes up at the end of the sentence ▪ Cries immediately ▪ Over-hysterical ▪ Asks irrelevant questions-about dogs not husband who has just been killed ▪ Facts within story are inconsistent ▪ Begins clip with trembling voice but by	▪ Forced emotion ▪ High Pitched-Vocal ▪ Focus on irrelevant details-deflection from situation ▪ Inconsistency ▪ Changes in behaviour within a short space of time	▪ Emotion ▪ Vocal Features ▪ Verbal Information

	the end is very steady and calm-seems strange		
55.	▪ Constantly expressing innocence ▪ Seems overly distressed and passionate ▪ Story seems deceitful-seems like they are keeping something a secret ▪ Demeanour changes when talking about missing person ▪ Constantly changing their tone of voice ▪ Voice is shaky ▪ Very quick to dismiss allegations against him	▪ Attempts to convince innocence to ensure credibility ▪ Forced emotion ▪ Inconsistent-witholding information ▪ Impersonal references to victim ▪ Changes in behaviour in short space of time ▪ Changes in tone-Vocal ▪ Nervous behaviour ▪ Focus on self	▪ Verbal Information ▪ Emotion ▪ Vocal Characteristics
56.	▪ Wasn't sincere or empathetic ▪ Story doesn't sound legitimate ▪ Does not seem emotional, people generally show more emotions during an appeal ▪ Too angry and emotional	▪ Lack of emotion ▪ Inconsistency ▪ Overcompensation-forced emotion	▪ Emotion ▪ Verbal Information
57.	▪ Does not ask the sort of questions you would expect in the situation ▪ Seems as though they are trying to make excuses ▪ Impersonal to victim-seem to mention all the family and the impact it has had on them	▪ Irrelevant questions-deflection of situation ▪ Impersonal reference to victim-Language	▪ Verbal Information
58.	▪ Constant repetition ▪ No specifics provided about the case ▪ Sounds like a tantrum ▪ Instant reaction-almost predictive and rehearsed ▪ Seems more concerned about own feelings ▪ Does not seem emotional, despite professing to be ▪ Rambling ▪ Dismissive ▪ Emotionless Delivery does not match or reinforce language ▪ Seemed more frustrated with allegations against them	▪ Repetition-Speech errors ▪ Lack of detail-Language ▪ Forced emotion ▪ Focus on self ▪ Rambling-speech dysfluency ▪ Lack of emotion ▪ Deflection of situation	▪ Verbal Information ▪ Emotion
59.	▪ Responses do not seem stable or reliable ▪ Immediate hysterics-no delay to process news husband has been killed	▪ Language-insincere ▪ Forced reaction ▪ Irrelevant questions-deflection of situation ▪ Lack of emotion ▪ Inconsistency	▪ Verbal Information ▪ Emotion

	▪ Irrelevant questions-more concerned with dogs ▪ Emotionless responses ▪ No remorse ▪ Inconsistent sequence of events ▪ Only seems to be in slight distress		
60.	▪ Dialogue is very confusing and difficult to comprehend ▪ Contradicting information provided ▪ Asks how they can prove innocence-what proof/evidence do they need ▪ Overly distraught-hyperventilating ▪ Asks about dogs-irrelevant details ▪ Story seems implausible-victim did not put up a fight or attempt to run-events unfolded in a different way to what has been said ▪ Nonsensical story ▪ Forced hyperventilation ▪ Does not sound passionate considering family member has just gone missing ▪ Overcontrolled delivery ▪ Reiterated already know facts as a method of defence	▪ Inconsistency ▪ Focus on self ▪ Forced emotion ▪ Focus on irrelevant details-deflection of situation ▪ Plausibility ▪ Impersonal reference to victim ▪ Lack of emotion	▪ Verbal Information ▪ Emotion

GROUPING THEMES INTO CATEGORIES

1. **EMOTION:** Forced Emotion, Lack of Emotion
2. **VERBAL INFORMATION:** Speech Errors/Dysfluency, Avoidance, Plausibility, Focus on Self, Use of Language
3. **VOCAL FEATURES:** Pitch, Tone, Changes

D. Original Video URL's

Video 1- https://www.youtube.com/watch?v=ZPJW93yMe8c

Video 2- https://www.youtube.com/watch?v=ym2W8gU5XFA

Video 3- https://www.youtube.com/watch?v=BvWOje46Xp8

Video 4- Supplied by Supervisor Dr. Clea Wright

Video 5- https://www.youtube.com/watch?v=xJB5lm1Wy0

Video 6- https://www.youtube.com/watch?v=jxq6Zvr8mPY

Video 7- https://www.youtube.com/watch?v=TXrtrp12-wg

Video 8- https://www.youtube.com/watch?v=8E_dTHeeszA